

## 'The chips are down'

A CALL for the government to mobilise resources on a scale "not seen since the war" to tackle the likely impact on employment of microprocessors and automation, has been made by Colin Hines of Earth Resources Research in London.

In a paper called "The chips are down," Hines says that there will be no easy "wind-waving" solutions to the increased unemployment that could flow from increased automation.

**T**HE marketing of Control Data optical character reading systems is likely to be taken over soon by OCR specialists, Scan-Data, following the announcement of a preliminary agreement between the two firms. This is also likely to lead to Control Data acquiring one million of Scan-Data's common shares.

**A COMPETITOR** for the Digital Equipment VAX 11/780 32-bit minicomputer is expected to be announced next month by Harris Computer Systems in the form of a machine with a 48-bit arithmetic processor. The I/O, memory access and DMA channels in the existing Harris Slash minis already handle 48 bits, but the processor has a 24-bit word length.

**A PROFIT** of £34 million before tax and extraordinary items was made by the National Enterprise Board in its 1977 financial year. A profit contribution of £7.21 million was made by ICL, in which the NEB has a shareholding of nearly 25%.

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If the RSRE run-time benchmarks are anything to go by, the HPA CORAL 68 compiler, or the PDP-11/70 with cache memory (880ns) under RSX-11M (Version 3) has produced aggregate timings of 48.38 seconds. Of course, users run their own benchmarks — there is far more to our compilers than mere speed and real-time programming.

A compatible compiler is available on Computer Automation's LSI-2 and another soon to be released for the NM4 series — cross-compilers also available.

Newfoundland House, The Quay, P.O. Box 1115, St. John's, Nfld. A1B 1X1, Canada  
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A SYSTEM which can outperform the 1900 series, can be adapted to handle efficiently any high level language, and which has a revolutionary design to deal with the "natural structures of information" has been demonstrated for over four years at ICL's Advanced Research and Advanced Development Centre in Stevenage.

This Centre also developed the Distributed Array Processor and Contents Addressable Files Store, which have both recently appeared as publicly available ICL projects.

In a talk to the ICL Users' Convention at Eastbourne last week, Gordon Scarrott, head of the Stevenage RADC, said that the new processor system, called the Variable Computer System, offers useful advantages compared to a 1900 sys-

**A DISAGREEMENT** over payment is to lead to the effective withdrawal of Seicon from Iran by the end of July. The company has been unable to agree on financial terms for the final phase of its work for the Law Coding Organisation of the Iranian Prime Ministry.

Seicon has for the last six years been working on the development of a sophisticated system for the retrieval of legal information, said to be one of the most advanced in the world. The system is currently being completed under the third phase of the contract relating to development work.

Chris Tendell, managing director of Seicon (Iran) cited developments in Iran, such as the very high rate of inflation and the emergence of local firms, staffed by Iranian nationals, as major factors leading to the rift.

The company continued to enjoy a very good relationship with the commissioning client, he said. However, the PBO had formed its own ideas on charges.

## Computastars first heat

A fourth and final 12-month contract had been planned to provide for post-implementation support. However, proposed Scicon charges for this work have proved unacceptable to the Planning and Budget Organisation, another division of the Prime Ministry.

**FOR computer people in the North, next Sunday, May 14, is an important sports date. That's the day when the first regional heat of the nationwide Computasters competition takes place at the Nab Wood Sports Centre, Bingley, Yorks. There will be 28 teams taking part, 20 of men and eight of women, and competition is expected to be fierce.**

**A CLEAR response in favour of public switched data networks is the first result to emerge from the survey carried out by the National Committee on Computer Networks.**

Seventy-five per cent of the sample of 480 computer network users said they would use such a network if it existed.

**INTRODUCTION** of new technology into the BBC's World Service centre at Bush House, London, in the form of a £1.5 million computer-based information distribution system, has been delayed by newswroom and clerical staff demands for an extra "technology allowance".

The BBC has agreed to pay extra to the clerical staff, members of the Association of Broadcasting Staffs, who will be responsible for input on the system, although the amount has not been agreed. But it has disagreed with the journalists, represented by the National Union of Journalists, which says that its members will require new skills to operate the system.

The new Electronic Distribution System will provide news staff with instant access to news stories via VDUs. They will be able to read the stories on the screen or get a hard copy.

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tion engineers — people concerned with the deployment of available technology to meet the information handling needs of society — will be to keep complexity under control and to provide database systems that are easier to use and more responsive to human requirements.

## PO export role with System X

DISCUSSIONS are under way which could lead to the Post Office taking a direct role in overseas marketing of the forthcoming System X all-electronic telephone exchange systems which are under development at GEC, Plessey and STC.

Two other national companies, Cable & Wireless, owned by the government, and International Aeradio, controlled by the nationalised British Airways, are also involved in the talks, and a joint telecommunications export company dubbed Britol could result.

Renewed pressure for a rationalisation of the UK electronic and telecommunication industry came last week following a speech by Ernest Harrison, chairman of Rocal.

## ICL expands S-range

A NEW entry in the ICL 2900 range, code-named S2 and believed to be a small 2940 model, has been revealed by ICL to some potential users. Other 2900 "S range" systems are likely to include improved versions of other 2900 models, the largest being the 2986.

One feature of the S systems, first introduced with the 2850, is more efficient I/O, communications and memory access structures. For larger systems, such as an improved 2970 model, processor power is boosted by improved instruction interleaving techniques.

**T**he Department of Industry accepts that information technology could lead to a "second industrial revolution" and believes that the existing government agencies working on the problem will eventually be able to come up with a solution. That was one of major policy viewpoints expressed by leading DoI civil servant Martin Lam last week. For more, see page 5.

COMPEC Europe closed its doors last Thursday on over 80 satisfied stand-holders who welcomed 5,602 visitors. Next year's exhibition—from May 8-10 promises to be bigger and better than ever. Meanwhile, the UK show, Compec 78, which this year takes place at Olympia, is nearly sold out.

SOME US IBM watchers have been predicting that launch of the E-series will be put off until spring 1979, but the leaks in Japan have led to revised forecasts that at least two of the predicted six models will appear later this year. The top machine is expected to offer twice the power of the 148, and the range is thought to be microprocessor based, as are Two P's V32 and National Semiconductor's System 400, both of which are 370 compatible (C/W, May 8).

**TOP** management changes are expected to be announced by the Centre-file bureau by the end of this week, although no details were available at the time of going to press. Centre-file is a subsidiary of the National Westminster Bank and specialises in accounting services for stockbrokers and building societies.

A NEW top-of-the-line 90-series model has been announced by Univac in the US. A cache memory has been added which is claimed to make it 35% faster than the 90/80-3, and maximum main memory is doubled to 16 Megabytes. A 2 Megabyte 90/80-4 costs \$1.3 million, compared to \$1 million for a 2 Megabyte 90/80-3.

THE majority of today's programmers are "amateurs" using "business" languages by Mephithophelias, such as Cobol and Fortran as "abominations without which we cannot live" and said that looping program structures were a "bastardized invention by Mephithophelias."

In the future, he believed, new paradigms and array processing computer architectures will be developed to help man to manage complex social problems.

The craft of programming, he believes, will turn into a questioning of architectural analysis, building a new paradigm from hardware modules to match the structure of the problem.

The "analytical architect" of the future will resemble an electrical engineer, he said, concerned primarily with selecting the correct components from a system from a catalogue of firmware components.

By the beginning of the next century, he believed, it was likely that there would be few jobs for the programming function as it is currently understood.

© See Computerview, page 2.

**A TEAM** from Rowntree Mackintosh dominated the men's events in the North East States of Competition, held at the National Sports Centre, Bingley, Yorks, last weekend. They romped away with the team title by scoring 152 points overall, with closest rivals, Platt Moss Lowell, the textile machinery manufacturers, second with 133 points.

THE squeeze is still on, but there is plenty to interest everybody in the compact Computer Weekly. At European there was a lot of talk about the evolution and the trail that micro are blazing into the 21st at the moment (page 11). From Brussels, Tim Palmer reports on Compu Europe, the new specialist show which is pulling in more exhibitors and more visitors each year (page 19). And all the regular features continue to offer a mixture of interesting and useful information. In the UK, the editors on Europe look at some users of the scrapped MCP VI (page 7); in Germany, they look at the need for good documentation (page 13); and in the Netherlands, Steve looks at IT's move into personal computers (page 14). In the US, he hits out at the government's policy for computers (page 15). Elsewhere there is growing controversy in Japan over the use of computers in school administration (page 19). There is also a lot of news about the new products of the first half of 1982 (page 12). The new adventures of the first half have been delayed because of the space problem but he is due back next week.

OVER THE COUNTER computer sales came to East London on Saturday when The Byte Shop at Ilford opened for business. The shop attracted a steady stream of "micro buffs" throughout the day eager to see some of the hardware about which they had only been able to read.

Sales on the first day were mainly of the wide range of books handled by LP Enterprises, the importing company run by Vince Cohen, a partner in the store. The shop will be selling the Commodore Command Set 77-88 system and Bearbag range of packaged board kits. A Commodore Pet is also to be added to the inventory. Cohen and his partner, Bill Cannions, plan to extend their retail operations and are considering franchising additional shops around the country. One planned for Birmingham could be open in a few months.

In addition to hardware, the Byte Shop offers two software packages written by Software Works Inc of America. These are Mailroom, an interactive mailing list package coping with up to 1,000 names and addresses, and Inventory i.e., an inventory control system for up to 999 items. Both packages are written in Basic and are intended to run on the 8080/286 based system using the North Star minifloppy disc system.

● Vince Cohen is pictured ringing up one of the first sales at the Byte Shop.

**By Keith Jones**

**MAJOR software companies in Europe and the US are preparing to bid for some of the biggest software contracts ever placed. The customer will be Nato and the main contract will involve a network of command and control systems covering European member countries and linking them with the US.**

**LOW-COST** alternatives to the IBM 370/138, 148 and the 3031 have been announced in the US this week by Magnuson Systems, the latest challenger to IBM with "look-alike" processors (CW, November 10, 1977). The Magnuson machines are said to be two to three times less expensive than their IBM equivalents.

Called the M80 Series, the processors each have 256K bytes of firmware, most of it unused at present, which should enable the machines to maintain compatibility with future firm operating systems. The only difference which IBM may introduce, Magnuson calls this "obsolescent-proof strategic architecture."

The company plans to launch the systems in Europe soon.

Distributed systems are no longer a concept for tomorrow. For several of Data Logic's clients they are, just becoming a reality. For one leading company we are implementing a network of over twenty minicomputers. For another, a system with ten processors. A third will have four inter-connected minis each supporting twelve or more remote terminals.

Each of these solutions was tailor-made to meet a specific need: Processor power, local storage, communications links and local data bases were all designed with care for optimum usability at minimum cost.

The clients supplied the crucial knowledge of their business environments. Data Logic supplied the technical skills. Jointly, we provided the ingredient that creative system solutions need: Intelligence.

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WHEN a man of the stature of Dr Carl Hammer criticises the majority of professional programmers and analysts as being "amateurs" (see front page) it is time to sit up and take note.

Like all generalisations, the validity of Dr Hammer's statement must be judged at its macro philosophical level rather than by bit picking at the details. In saying that nine out of ten programmers are amateurs, Dr Hammer was not offering a researched statistical figure or suggesting that the DP profession is filled with people who are consciously being charlatans or layabouts.

But he was pointing out that the rapid growth of computing usage has created a huge demand for staff to perform what at first sight seem to be demanding, intellectually complex tasks.

Although this is true for a

## Programmers and analysts Hammered

minority of systems design and implementation functions. It is not really true for the bulk of the work carried out by today's DP staff.

Often the work is more analogous to traditional routine clerical functions than to the popular image of the mathematical genius grappling with intricate matters of systems and programming logic design.

Within the computer "profession," particularly in the UK with its continuing class and educational divisions, there is even a feeling that software people are in some way superior

to the people who bear the brunt of systems implementation, the operations staff.

This is reflected in the ridiculous state of affairs where operations staff, who can make or break the effective running of a system, are generally paid less than programming staff, who often have very little understanding of the importance of the end product to the user.

The way in which computers have become an intrinsic part of the fabric of society, coupled with the general failure of software people to design and implement reliable, useable systems

to tight deadlines, has meant that at a time of general unemployment, there is an insatiable demand for programmers and analysts to sort out past bugs and develop new systems.

In many organisations, young programmers doing relatively undemanding tasks are being paid as much or more than men and women with a lifetime's experience. Even if a computer system might sometimes threaten other people's employment, DP staff can sleep comfortably, secure in the knowledge that there will be acres of job vacancies in the computer Press each week.

Dr Hammer's words should be a sharp reminder, particularly to analysts and programmers, that their highly privileged position in society should result in a professional attitude to the creation of systems and a responsible concern for the impact the technology will have on society as a whole.

## French attack on telecoms authorities

A MAJOR attack has been made on telecommunications authorities by Louis Pouzin, research director of the Institut de Recherche d'Informatique et d'Automatique, near Paris.

Speaking at Eurocomp 78 last week, Pouzin said that PTT had consistently ignored the findings of research network and the standards produced by international Standards Organisation.

He said that PTT packet networks lacked any system architecture and just piled up interfaces one on top of another. The CCITT interfaces such as X25 had been badly designed and could be used only with additional overhead and some limitations.

He went on to say that X21 had been announced as the universal synchronous data interface for Public Data Networks, but it had not enabled a network to be built.

Similarly X25 was defined for switched virtual circuits carrying packets. But it needed an estimated 4,000 instructions to implement and required the addition of a further interface, the packet assembler/disassembler, to handle asynchronous terminals.

As so far defined, PAD only worked with 1A5 code, at 110 or 300 bps, and this was in conflict with CCITT recommendation XI.

Pouzin foresees that still further interfaces will be needed to handle demand for accessing simpler terminals, equipment only connected to exchange lines, and more sophisticated devices incorporating page control, password control, code translation and message handling.

It is not proven that technology loses jobs," he said. "It creates jobs as well as destroying them."

There was increasing public concern, he added, that society would reach 1984 before time and the issues must be dealt with unemotionally, in public.

More on the impact of computers, pages 6, 11 and 48.

Operators' dispute settled

A DISPUTE over pay-conditions involving 40 operators employed by British Aerospace was resolved last week. One of the operators said, "We are now happy we will get the conditions we want, including facilities for preparing food and refreshments during evening and night shifts."

Check mate

A MORE powerful version of Chess Challenger, the computerised chessboard, has been introduced by Spectrum Marketing. Known as the master version, it offers three levels of play: for beginners, average and better players, and, in addition, allows the player to select offence or defence — while of black pieces.

Online user group

MEETINGS are being arranged in several cities during May and June for users of online information systems interested in forming a UK user group.

## IBM on liberty debate

THE managing director of IBM UK, Eddie Nixon, has added his voice to those calling for a debate on the effect of computers on liberty and employment. In a talk to the CSA "The social impact of computing," Nixon said that IBM would be ready to help in its investigation of these weighty issues.

In asserting that the debate hitherto has been largely emotional, Nixon emphasised that the relationship perceived between technology and unemployment was only partly due to the technology itself. It also stemmed from failure in marketing, in that new trade produced new jobs, and from the restructuring of society from being industrial to being based on services.

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## All is revealed at hush-hush traffic centre

By Chris Youett

SHHH... there's a "hush hush" computer centre being built somewhere in the Midlands that will control traffic signals on Britain's 2,000 miles of motorway.

Any budding James Bond can find its location from the public records of Warwickshire County Council, which gave the building planning permission.

But reports last week indicated that a security clampdown on its location had been ordered by government officials because of fears of vandalism and possible terrorist attacks.

It is understood that a lot of money is being spent on security devices.

When this was put to the Department of the Environment in London, a spokesman said: "Oh, really, I wasn't aware of that."

Building work started quietly in Colehill Heath Road, Colehill, near Birmingham, last year, and the £150,000 shell is nearly complete.

It is understood that inside the shell is another building — a rather like a Chinese puzzle.

Originally, it was to have been one of a number of regional computer centres with the capacity to control the

whole network and the site, by the side of the M6 motorway, was picked "because it was more convenient," said the spokesman.

It should be operational after 1980 and police will input weather and crash data. The computer will automatically flash up a series of warning signs along the affected stretch of motorway.

Other extensions include facilities for use directed I/O, similar to those in Basic, and modifications in the processing of arrays and the DO loop.

Another new feature is the inclusion of IF, ELSE IF, ELSE, and ENDIF statements, providing an important program structuring tool.

A large part of the extension has concentrated on enhancing the I/O facilities of Fortran. The language now includes OPEN, CLOSE, and INQUIRE statements for file processing, supporting both direct access and sequential files.

Direct access files will require an explicit OPEN statement whereas for sequential files an implicit OPEN will be generated on the first reference if the statement is omitted. Thus

existing Fortran programs processing sequential files will continue to work.

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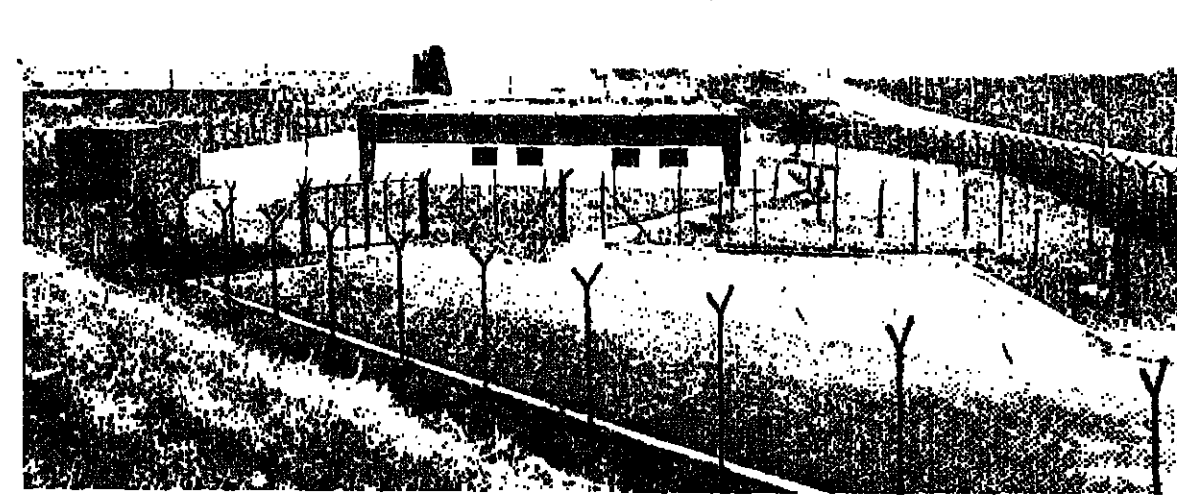
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## Brussels Mandate to meet in London

THE inhibiting effect of telecommunications legislation on the growth of international networks will be one of the main talking points at the first meeting of the Brussels Mandate in London on June 15 and 16.

So called because the concept was formulated after the Online conference on transnational data flow in Brussels earlier this year, the Brussels Mandate is the brainchild of American lawyer John Eger, who worked for the AT&T telecommunications giant for 15 years before becoming telecommunications adviser to the Nixon/Ford Administration in Washington.

Eger said that he saw the Brussels Mandate as a world club for communications policy concerned essentially with freedom of communications and the laws that discouraged this.

Eger told Computer Weekly that he hoped the London meeting would attract representatives from government, the academic world and from telecommunications users in roughly equal numbers. Big international network users like the Chase Manhattan Bank and American Express had already decided to attend.

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## FOCUS

A DAY in the life of the average DPM is not noted as being one of relaxation — or joy. Many consider that they pack more life into one day than most other working members of commerce and industry, so it is hardly surprising that the DPM's own education and training come low down on his work role.

No sooner has the dedicated DPM dusted off his management training course schedules when duty calls: The data prep supervisor is uptight about her machines being used by the night shift operators. Faulty batches should stay that way until normal services are resumed the next day. Shipbuilding unions could well pick up a few demarcation tips from DP installations.

The next crisis is from the control section. The latest delivery of invoice statements has been printed minus the company name and address. Fresh supplies will take at least nine weeks. While organising a supply of sticky labels (plus computer run-time), the DPM may ruefully reflect that life as a deep-sea diver would have less ups and downs — especially the downs.

The lunch interrupt comes from the systems manager. His estimate of a three months' implementation for that urgent warehousing application has gone offline. Unless additional resources are made available, completion of the project will

be shelved for a further three months. A misunderstanding of user requirements is to blame.

It is all too easy for the DPM's own career to get blown off course by everyday installation happenings. For example, the current office status symbol is to have an individual delivery of print-outs. Data flows in such circumstances in all directions. But should one such report go astray, the company's affairs could grind to a halt.

Seldom, it seems, does anyone query the necessity for all this information flow. Certainly not the DP team who are themselves accustomed to being buried deep in paper. Supervising the daily paper chase could be almost a full-time job in itself.

Management information may well be the name of the game. But most DP managers would welcome a spot of information themselves. Are the daily reports too much, too late or just redundant? Are there grounds for dumping earlier in the production cycle?

It is time that the DPM dropped his machine supervisor role. There are better opportunities and prospects outside the installation door. Meanwhile, Delphic Poils are forecasting an uprising of anti-computer Ludlows.

It could well be the DPM who leads the charge....

Managing the DP manager

REPLACEMENTS have been found by Nixdorf UK for its general service manager, David Atwell, and software manager, Jill Hancock, who left the company a few weeks ago.

But Nixdorf has not yet found a suitable controller to replace Owen Cookson who, with managing director, Mike Burdon, left last month. According to the new managing director, Bert Hoffer, they left by mutual agreement with the Nixdorf board in Germany.

Taking over as software manager at Nixdorf is Dave Harland, who was formerly training manager; while the man in charge of general service now is Ulf Sailer, who earlier shared this job with David Atwell.

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Beehive launches mini

ATEST entrant into the bit-slice microprocessor-based minicomputer market is US test specialist Beehive. The product, expected to be called the B800 if Burroughs does not intervene on behalf of its own B800 lines, is to make its European debut at Slob where it will be shown by French distributor Tracor. The machine emulates the Data General Nova instruction set.

COMPUTABITS

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## Nixdorf names new managers

REPLACEMENTS have been found by Nixdorf UK for its general service manager, David Atwell, and software manager, Jill Hancock, who left the company a few weeks ago.

But Nixdorf has not yet found a suitable controller to replace Owen Cookson who, with managing director, Mike Burdon, left last month. According to the new managing director, Bert Hoffer, they left by mutual agreement with the Nixdorf board in Germany.

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## Sporting Life shies at first fence

A LACK of adequate training for operators and the complex nature of the newspaper, rather than faults in the computer system, have been blamed for the recent problems encountered by Sporting Life, following its move over to computer typesetting/print technology.

Due to this, Sporting Life, which is one of Mirror Group Newspapers, lost six issues last week and had to return to hot metal production at the beginning of this week to resume publication.

The computer hardware involved is based on Prime 100 minicomputers linked to Linotype Paul typesetting equipment.

"The complex nature of Sporting Life, which has a lot of detailed editorial information like race programmes, was an important reason for the problems," said a spokesman for the National Graphical Association, which has the majority of computer typesetting operators among its members at MGN.

It is really a question of further personal training, which I believe is being undertaken."

This is supported by the fact that Revell, a less complicated tabloid newspaper which was the first MGN publication to go over to the new technology, is now operating normally. Sporting Life, however, is a broadsheet, and has a higher density of editorial material.

It is believed that Sporting Life will now be the last MGN paper to go over to the new technology. Instead of the second, and its place will be taken by the Sunday People, Sunday Mirror, or Daily Mirror.

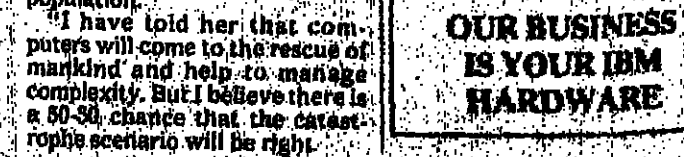


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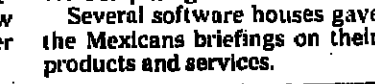
All this barrage of statistics lends undeniable force to Dr Hammer's contention that there is an urgent worldwide need to plan for the future — "forward engineering," as he calls it — and assess how technology might be able to help humanity manage its increasingly complex affairs.

One step towards the new architecture, he said, would be to have a single instruction stream acting on a number of different data streams at the same time. Ultimately, the aim

Dr. Hammer had no clear answer. As a partial solution, he suggested that there should be a system of "universal continuum education" which would soak up some of the increased unemployment and, hopefully, enhance the lives of people.



9. Currier recently joined Altergo Software from Informatics, and previously worked on advanced TP software for NASA.



## CENTRONICS PRINTERS



## SOFTWARE FILE-1

## Dol moves on Status II marketing co-ordination

AN INITIATIVE has been taken by the Department of Industry to co-ordinate the further development and exploitation of Status II, the information retrieval package developed by the Harwell Laboratory of the United Kingdom Atomic Energy Authority.

The Department, which previously contributed funds for the development of the package, has set up a Status Club. Members will have franchise rights to the system in different market sectors. It is also to carry out an initial survey of the potential market.

Intended to be self-financing out of licence receipts, the club will be administered by the Harwell Laboratory. Initial members include ICL, Datskil, Systems Designers Ltd, GEC, Ferranti,

BOC Datasolve, and CTL.

According to a Dol spokesman, the Department felt that there is a need for a strong UK package in this area. It decided to standardise on Status because of its applicability to a wider range of machines than other systems, notably the Bird system originally developed at Queen's University, Belfast.

Aspects of Bird had however been incorporated into recent versions of Status, he said.

About a dozen organisations outside the UKAEA already use Status II, on machines ranging from minicomputers to large mainframes. Applications range from the legal and bibliographical fields, to those with requirements for very rapid changes to a databank containing both free text and numerical information.

## Applications packs for ADDS 50, 70

The first of a series of applications packages for the System 50 and System 70 range of intelligent terminals has been announced by ADDS UK. Produced by Gemini Computer Systems, it is available through ADDS' distributor network, which is still being built up.

Adds is a suite of ten programs dealing with weekly and monthly payroll for £600, Addison deals with sales, purchase and nominal ledgers for £1,500, and Addstock will deal with production planning and control.

Both terminals are compatible with the IBM 3740, but the System 70 with its extra Intel 8080 microprocessor and 8K bytes of RAM, can emulate the ICL 7020 enabling it to communicate with ICL mainframes.

## Heavyweights join US patents battle

SUPPORT has built up on both sides in the current US Supreme Court case on patenting computer software. Lurelle Parker (Acting Commissioner of Patents and Trademarks) v Dale Flook which centres round software for the automation of an oil refinery.

In addition to Adapso (Software File, May 4), organisations filing amicus curiae briefs in favour of patentability are Applied Data Research, Software Associates Inc, and Mobil Oil Corp.

Filing against is CBEMA — Computer and Business Equipment Manufacturers Association — whose members include IBM, Sperry Rand, NCR and other dominant hardware manufacturers.

The ADR brief opposes the idea put forward by the Patents Office and CBEMA that software is an "idea", a "method of doing business", or a "mathematical algorithm". Instead it argues that software is one means of implementing a machine system.

Software patents, it says, are

patents on special-purpose machine systems that, for technological and economic reasons, are constructed by means of stored programs (ie software) and a general-purpose computer.

The company's argument hinges on the assertion that software and hardware are engineering equivalents, such that any "software machine" (ie program) could alternatively be built in hardware.

Economic factors — namely the cost of designing and producing special integrated circuits — are cited as the major reason for not producing hardware versions.

In addition to minimum volume arguments against implementation in firmware, ADR also points to the greater ease with which enhancements can be made in conventional software.

The brief notes that the Court of Customs and Patent Appeals has in prior cases found that "hardware and software forms of programming are engineering equivalents".

The court has also previously established, says ADR, that "general-purpose hardware is structured by software into a special-purpose computer, and that the structure of this special-purpose machine is different from that of the general-purpose machine and is determined by the inserted software".

ADR's interest in the question is more than theoretical: the company holds software patents on two of its products and has received a third patent for its Star hardware/software system for telephone monitoring.

One of the software patents, for a method of magnetic tape sorting, has been obtained by developments in technology. But the other, for the company's Autoflow automatic flowchart

presumably still offers useful protection for the product, one of the most widely sold of proprietary software packages.

The company explains its "with the advent of microcomputers and integrated circuits it is possible to build an Autoflow machine system completely in hardware, based on the principles covered in the patent."

"Each of the functions can be put into one or more chips and the entire machine logic would be the size of today's calculator and would form a 'big box'.... The price of such a machine might be inordinately high however."

## Datamanager successes

NORTH American users of MSP's Datamanager data dictionary are holding their fourth annual conference this week in Cambridge, Massachusetts.

Datamanager, which has about 100 users in North America, was the high-scoring system out of four data dictionary packages included in the December 1977 USA Datapro report. In addition, Datapro reports that it was the only data dictionary to perform as advertised immediately.

The conference ends tomorrow (Friday).

## Coral 'first'

FULL approval has been granted by ICL's Inter-Departmental Committee on Computer Applications to the Semiconductor R&D Centre. This is the first time a resident computer system has been approved, and has been approved, and has been approved.

## SOFTWARE FILE-2

## IBM man to give insight into Ironman

ANOTHER opportunity to gain an insight into the Pentagon's Ironman project is provided, surprisingly, by the next meeting of the BCS PL/I specialist group.

PL/I was one of the languages originally considered as a basis for the development. One of those who worked on adapting the language to meet the Ironman specification, Bob Maddocks of IBM Harwell, will describe this work to the specialist group.

Maddocks' presentation, entitled "The PL/I approach to the Ironman project," will fall into two parts: an appreciation of the project as a whole, followed by a description of the PL/I modifications and extensions which were proposed.

The meeting, which is open to all, will be held on May 25 in Room 45 of the London School of Economics, Houghton St, London, WC2. Scheduled to start at 8 pm, the meeting will begin with the typically brief AGM of the PL/I specialist group.

## Burroughs soothes anger over MCP

A REPORT currently being distributed to Burroughs medium-system sites should go some way to alleviating user anger over the scrapping of MCP VI. Support for DMS II is now scheduled to materialise in the first quarter of 1979.

Burroughs' decision to kill MCP VI (Software File, January 12) shocked many users in Europe and in the US. A crucial factor was the implicit cancellation of eagerly-anticipated support for DMS II, Burroughs' highly regarded database management system.

Some users with plans to develop large online databases were thereby obliged to consider a costly upgrade to a large Burroughs system: the B8700 and B7700, and their successors, the B6800 and B7800, already support DMS II, as do the small machines, the B1700 and B1800.

In recognition of user anxiety,

Burroughs allowed a four-man investigating team from Europe to visit its US plant in Detroit and Pasadena earlier this year.

According to Tony Bale, chairman of the Association of Burroughs Computer Users in the UK, this team was given every facility by the company and came back substantially reassured over Burroughs' plans for dealing with the problem.

The team, which included two delegates from the UK and two from Holland, has now completed a detailed report on its findings, which is being circulated to medium-system users.

One of the UK delegates, Eric Holloway of Alcan Management Services, said it was now clear that Burroughs had made the right decision in cancelling MCP VI. Although there was no evidence that it failed to meet the functional specification,

performance had been unacceptably poor.

He added that a serious commitment was now evident to redeveloping the operating system. The first fruits of this effort would be a level O release of the re-worked MCP VI.

This would be followed in the third quarter by release VI.1, which would support DMS I, an enhanced version of Forte II. Support for DMS II was projected for the first quarter of 1979, with release VI.2.

## SPEL from Dacoli

A PROGRAMMING language has been developed by Scottish systems house Dacoli to increase the facilities available to users of the DL 180 VDU data entry system. The language, SPEL, enables the equipment to be used for stand-alone processing as well as data entry.

## Offer of free development time

FOLLOWING the establishment of a UK subsidiary earlier this year (CW, January 19) Basic Timesharing is offering, to qualified UK software houses, free development time on a BTI 4000 system installed at its offices in Slough.

To be eligible, software houses must have experience in Basic and must have an in-depth knowledge of a potential applications area.

The first firm to take up the offer is Hunter Software, which is developing a system for handling hotel reservations and associated commercial accounting. Both companies believe that there is a strong demand for an inexpensive system in this area.

The package, being written in Basic Timesharing's Basic X, will initially be aimed at BTI 4000 users. However, Hunter anticipates adapting the software to run on other systems. "Good software sells systems," said Basic Timesharing's UK marketing manager Mike Payne. In explanation of the scheme, the company, which built its first packaged system in 1971, has about 750 systems installed or on order worldwide, 12 of these being in the UK.

## Boole Babbage first in marketing moves

THE latest company to be formed expressly to market software products starts off with two Boole and Babbage products for IBM OS users. The company, The European Software Co, holds European licences for Resolve, an online operations monitor (CW, November 11, 1976), and Secure, a new data access and system integrity package.

## Boeing makes own packs available in UK

SOFTWARE developed by Boeing for its own senior management has been made available on the Mainstream-CTS time sharing service run by Boeing Computer Centres. Executive Information Service is a set of planning and analytical tools for direct use by

managers and business analysts. The system provides linked interactive facilities for financial applications, modelling, what-if and sensitivity analysis, forecasting and statistics, report writing, graphics, and data management.

The EIS command language

allows users to store and manipulate time series and other data directly without being concerned about the size of the data. A particular feature of the system is a powerful graphics capability which includes the production of histograms, pie charts and 3D graphs.

## GILB'S MYTHODOLOGY

## Reliable fast input is not dependent on hardware

TRYING to justify a switch to a small online system, in place of batch work carried out by a bureau, a client of mine claimed "online data entry will reduce the high level of input errors".

This myth has been so well sold, that it would not surprise me if many readers believe it to some degree. I suppose I accepted the concept at one time too.

The turning point in my own thinking was when I designed

and installed an order entry/invoicing system which could take its data either online or offline (interactive or batch) modes. This gave me an opportunity to see the differences between the modes of operation.

There is the danger that when a weekly designed batch system is converted to a well-designed interactive input system we falsely credit "online" with improvements which, in fact, are not dependent on the

concept of interactivity.

The invoicing system, with both possibilities, showed there was no difference in the rate of input errors which slipped past programmed checks. In both batch and interactive cases the error rate, as measured by customer complaints and correction due to wrong input, was extremely low.

The major difference we observed was that the interactive entry work took about three hours for a morning post batch, while the batch work took a little over one half hour, plus five minutes for corrections to the first batch run.

Not really strange when you consider that in the interactive system the machine spent a lot of time waiting for the human to key and think and interpret handwriting, while the human spent time waiting for (low priority) response time.

Certain "instant" demands on the system were handled by getting the products immediately from the warehouse, without waiting even for an online system, and the "same day" service objectives were easily met by the batch system.

There was no other difference in the two modes of operation, so the online mode was dropped entirely, and the system happily operated in batch mode for the next years.

I don't doubt for a moment that many readers have experienced improvements when making the transition from batch to online data entry.

My objective is not here to say that "online is wrong" — it isn't. It has its place, and current economics favour it highly.



The solutions are several and should normally be applied as a well designed set of techniques. I will give a short list of some of these solutions, so that you get the flavour, but for detailed technology I must refer the reader to our book "Humanised Input" (Gilb and Weinberg, Wintthrop/Prentice-Hall, 1977).

Error control techniques that are independent of online batch mode: 1. state clear, quantitative and practically measurable goals for human productivity and error-free, at the beginning of your project; 2. don't be afraid to let a certain amount of input redundancy get into the input; 3. make the input codes as natural and simple as possible for the user; 4. make far better use of file data to check and correct input data; 5. provide for adaptive learning, by experience, in your system, such as self-adjusting product quantity limit-checks or quantity pattern-check codes; 6. do not make your system reliant on human ability to detect and correct errors; put all your effort into automated error control and take human abilities as a bonus; 7. pick up natural data as directly as possible. Avoid filling out forms and finding computer codes; and, 8. those who are currently filling out your forms should be doing the keying. Those who are currently keying should be upgraded or eliminated from your input process.

GILB'S HYPOTHESIS: Reliable and fast data collection is a technology which is largely independent of the hardware you make use of.

## Puzzler

THE seven-a-side soccer finals at International Computers finish up as follows:

	P	W	D	L	F	A
Analysts Athletic	3	2	1	0	4	1
Designers United	3	2	0	1	3	2
Hardware Wanderers	3	0	2	1	0	4
Software Rovers	3	0	1	2	1	

What was the score in the Analysts-Designers match?

See page 45 for solution.

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PROGRAMMER NOTES  
Generated code and macro pre-processors

HIGH-LEVEL language programmers are frequently not concerned with the vagaries of the code finally generated. However, when macro pre-processors are used to provide "structured programming" constructs in an assembler, the pre-processor output is likely to be the programmer's working document.

How closely should the generated code reflect the original structure?

Keen Programmer Notes readers will recognise Figure 1 (below) as having appeared in the column for April 20. It shows a piece of structured program logic and the generated assembler code from a macro pre-processor and the standard Digital Equipment PDP-11 two-pass assembler.

Charles Sharp from the Neuropsychology Research Unit at University College Hospital Medical School used macros from Waterloo University, Ontario to produce the example. Brian Gilbert, a director of Octave Computer Projects of Farnborough, Hampshire was surprised at the generated code. How, he wondered, was it possible for the end-of-loop condition to be tested at the start of the section, ie TST EOFBSW, when the original UNTIL macro was used at the end of the section? Also worrying Gilbert were the branches BACK to label L3.

Taken on their own his queries may seem pedantic, but the underlying thought is, will programmers use macros if the generated code has such magic

qualities about it? The original macros served to show the structure of the logic, but the generated code has no immediate flow. Programmers may feel less enthusiastic about the use of macros if the generated code is difficult to follow.

Charles Sharp notes that the LOOP, IF, ELSE, END and UNTIL macros use internal variables for labels and block counters. An IF macro increments the counters and the END macro decrements them. In this way, it can keep track of the levels within a loop.

Also the DEC PDP-11 Assembler is sufficiently powerful to allow macros to invoke other macros and thereby can switch code from one position to another during assembly, as in the example.

But the original Programmer Notes also pointed out that while macro pre-processors improve assembly languages over the manufacturer's offerings, a more logical approach to mnemonics can also help.

Gilbert says DEC users should not complain; they have yet to encounter Data General assembler and mnemonics. Gilbert can easily scan through DEC code and understand it, but he finds Data General code virtually impossible.

"I can see the historic basis behind the code. An engineer could virtually draw the circuit diagram of logic gates from a sample. But it's hardly a programmer's tool."

```

LOOP
IF A, GE
ADD A, TPOS
INC NPOS
ELSE
ADD A, TNEG
INC NNEG
END
UNTIL EOFBSW, ON,
Translated becomes the following code:
L3: TST EOFBSW
BNE L1
TST A
BMI L2
ADD A, TPOS
INC NPOS
BR L3
L2: ADD A, TNEG
INC NNEG
BR L3
L3: CONTINUE
are we at EOF?
is A -ve?
If so, branch L2
A is -ve

```

Figure 1

Datasolve

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## Building an exam bank

THIS board offers examinations in data preparation at both elementary and intermediate levels, which basically test the ability to operate key-depression machines for punched cards or paper tape.

At present the board has a small bank of appropriate documents used to compile the intermediate examinations but we would like to add to this, and possibly to build up a similar bank for the elementary examinations.

I would be very grateful to receive any documents which the readers of Computer Weekly think might be suitable. If there are any queries I would be glad to answer them over the telephone on 01-559 2366.

WENDY RILEY  
The Royal Society of Arts  
Examinations Board,  
18 Adam Street,  
London,  
WC2N 6AJ.

## LETTERS

To: The Editor, Computer Weekly,  
Dorset House, Stamford Street, London SE1 9LU

## Can high technology gain real foothold in UK?

THE BBC Horizon programme dealing with the impact of micros, demanded urgent action by the government or, at the very least, a strategy for the computer industry. There followed some brave words by Tim Wickes "the UK virtually stands still, almost totally lacking direction and positive plans for building a sound and strong

industry — and most terrifying of all is the ominous silence from our government." (CW, April 13). Later he said that we lack the venture capital to exploit innovation.

I am in the unusual situation of having seen a major British electronics company refuse to exploit what they admitted was an innovation of major potential

even though they were offered 100% government financial backing. I shall be happy to give details to any inquirer.

Although refusal to develop new products, even at no risk does mean that that particular company will slowly decline, I am convinced that that course of action gives the best short and medium term career prospects

to middle and upper management in the company.

It is time that we faced up to discussing the career and security threat that a major innovation presents to a manager in a typical British company. In all the companies that I have studied, I do not believe that the existing management would survive a tenfold increase in profitability of the company.

Technology and product advance at anything above minimal speed necessarily implies loss of control of the company to the technocrats by the ruling technology-free management.

It is not accidental that there is no case on record of the British government giving significant support to any industry less than 25 years old; that government support for an industry is proportional to its age.

The British people are deeply conservative, and seem most partial to a return to the pre-industrial, feudal social structure. Spain is our model for behaviour in the immediate post colonial era.

Accidents sometimes happen, and it is possible that high technology will gain a real foothold in Britain, just as it would have been possible for new methods of creating wealth to have been allowed to develop in Spain by the rump which ruled and then lost their empire.

It seems clear that what the British people will permit is cosmetic support for high technology: products and developments can be supported, but support must stop well before there is the possibility of them creating profit and thence a new power base.

What I see, in both private industry and in government, is money being burnt up in the vicinity of major high technology potentials, as a cosmetic to tide the unwillingness to allow a threat to our society's stability. That way, high technology can be discredited, and its sting drawn.

Admittedly our society will then decline, but at least it will decline in an orderly, decorous manner, or so it is hoped.

IVOR CATT  
St Albans, Herts.

## NEB must act now on DP investment

I WAS most interested to read your interview with Sir Keith Joseph (CW, April 27). It showed that he has a keen understanding of our industry, but sadly it showed that information technology can easily become a political ball in a game between the Labour and Conservative Parties where both sides and the country lose.

Innovators and small computer company entrepreneurs need venture capital — and with the financial climate as it is today, the National Enterprise Board has a vital role to play in fulfilling this need. We cannot wait for what the Conservatives might do.

I would, however, recommend that the NEB looks more at the concept of multiple small fun-

dings as well as the large type of investment such as it has made with Inasac.

The principle of venture capital is that one in four ventures will be successful. On this basis an investment of £5 million spread over 20 companies can give us at least five new thriving British companies.

There are many other problems for our innovators and entrepreneurs to overcome to be successful in the international markets but venture capital is the fundamental ingredient and its availability is needed now.

Interco,  
London.

TIM WICKES

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondents state that their letters may not be cut.

## Ops must go it alone

IF the attitude expressed by Mr Benson (CW, May 4) is typical of other trade unions with which we operators must align ourselves, then it is patently obvious that we must go it alone — not only for the good of ourselves, but also for the rest of the working class.

With the Luddite fear of technology and the backward thinking of many trade unions, they would like to see Britain's technology held in check while, as is happening at present, the Japanese and other technological nations force our economy into dire straits.

The problems trade union should be tackling are those of the distribution of wealth and what life will be like in a technological society.

Unemployment is here to stay because, as technology increases, so too does automation and unemployment. The union in fact all of us, should strive to remove the stigma attached to being unemployed.

As the "de-skilling" of jobs progressively continues, we must ensure that our lives become centralised around our pastimes and leisure activities and, not as it is today, around our careers. We must educate people to make better use of their spare time.

Turning to Mr Benson's article, I see he complains about differentials between operators and programmers being eroded.

Yet he himself admits to operators becoming more technical and increases in shift allowances. It appears to me that Mr Benson, like many computer industry managers, looks upon shift allowances as a perk.

What we operators strive for is a fiveable wage without shift allowances, which should be calculated and shown separately on our wage slips, as is legally required.

Mr Benson, like many others, looks at the operator's gross wage when comparing it with programmers and the like. We operators are used to managing operators in this game. But coming from Mr Benson the attitude is shocking and disturbing.

If he were to remove the shift allowance from our salaries we would notice how low paid we operators really are.

If operators would like to form their own trade union, I would be only too glad to organise meeting.

P. BRIDGES

25 Southport Road,  
Whitby,  
Yorkshire.

## OP SPOT

By Bernard Allen

## The importance of documentation

FOR an operations department to be a well-run, co-ordinated unit it is essential that staff are able to find out information about the system and major applications from documentation.

Good documentation ensures continuity when people are either sick or on holiday, and is vital at sites where contract staff are employed.

Since the prime aims of documentation are communication and instruction it is important that it is written clearly and simply, with no chance of any misunderstandings.

At some of the larger installations a technical writer is employed on a full-time basis and one of his duties is the maintenance of operations documentation, but at the smaller sites it is often left, for example, to a shift leader, who has too little time to carry out the function effectively.

What happens when there is a lack of documentation? Let us consider an occurrence at one installation I know of where the matter is given scant attention.

Contrary to installation standards, a programmer used the testing stream to submit a job using a system utility program in order to compress a program library, or file.

Now library compression often takes a considerable time, and the job soon exceeded that allocated to testing stream work at the site.

The console operator had no

indication of the nature of the job and, following the installation procedure, tried to contact the programmer to find out if there was a valid reason. Unfortunately the programmer could not be found. Again following the installation procedure, the operator then cancelled the job with the result that the program library was corrupted.

Understandably the programmer was extremely upset because he had to re-create the library, which meant considerable work on his part. The operator was also unhappy for it meant that he and his colleagues would again be blamed unfairly.

How could this situation have been avoided? One of the best methods of documentation, which would have been useful here, is to maintain a run book or manual and to supplement that by submitting each job to the computer room accompanied by a run sheet.

The run manual should contain, for example, a description of each system along with its JCL and restart procedures. Details of input and output requirements should also be included.

From the above example, it is clear that the run sheets submitted along with the job should have some information about the type of program being used and whether or not it can be cancelled.

Other information on the run sheet might include:

- 1) Class of job. (The classes should be clearly defined in the run manual.)
- 2) Estimated run time.
- 3) Telephone number of the programmer concerned.
- 4) Resource requirements of the job — specifying the amount of storage required and the volume serial numbers of any tapes and discs to be used.
- 5) Any other information which the operators and programmers think would aid communication.

At a certain installation a file containing examples of each type of pre-printed stationery used at the site is maintained. It is kept near the printers and its numerical arrangement is in accordance with the numbers issued by the system as a particular type of stationery is required.

The run sheet for a particular job or set of jobs should be submitted to the computer room well before the run is due, so that the operators can make preparations well in advance.

The operators should always be asked for their opinions on the subject, and whoever is responsible for writing the documentation should listen to what they have to say.

Finally bear in mind that common sense should prevail in all matters. If a programmer relates some incomplete or incorrect information, give him the benefit of the doubt and, if at all possible, let the job run to its conclusion. The programmer concerned should also be told about it.

Thus the procedure may be

modified to serve any output class like any other writer. This is achieved by the following OS command:

F SCRAPIT, CLASS = output class

This is very useful, for example, when a programmer has "hands on" time and has produced a lot of output which is not needed. Of course, modifying the procedure in this manner should be carried out with extreme care. As soon as it has done what is required, SCRAPIT should be re-modified to cater for output class Z.

AS mentioned in Op Spot two weeks ago, Opcomm, the Coventry-based operations group, is to hold a large social meeting for operations staff and friends.

Pete Brimble, the group's newly-appointed social secretary has arranged for a discotheque to be held at the

Alhambra public house, Silver Street, Coventry on Thursday, May 25, 8.00 pm to midnight.

There is an admission fee of £1 and a buffet will be provided. Tickets may be purchased at the door or obtained from Mike Rees, Flat 1, 1 Broadway Mansions, Broadway, Earlsdon, Coventry, CV5 6NR.

Operators often complain that nobody listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations. Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU. Telephone calls are equally welcome and Bernard can be contacted directly on 01-281 8035.



## Waiting for the right moment...

THEY are a watched pot never boils — which is probably just as well for this foundry worker at transmission components manufacturer Frank Wigglesworth Ltd is watching the colour of molten metal change as it cools, waiting for the right moment to pour it into a mould.

The wide range of management information being generated by this worker as he carries out his job is now available to the Yorkshire-based company on a Data General Nova 3 minicomputer which it has installed to handle stock control, order entry, purchase ledger, sales ledger and other management information applications.

The company's plans for future use of the system include the production of numerical control tapes for automatic machine tools.

## Amdahl first quarter profits up 78% despite one-third price cuts

FIRST quarter profits at Amdahl were up a formidable 78% on sales up 68% compared with the corresponding period in 1977. Turnover was \$63.75 million and pre-tax profit \$19.13 million.

Amdahl points out that the improvements were achieved despite price cuts of 35%.

The company has changed its accounting policy so that sales are recorded once a machine is handed over to the customer. Formerly sales were only upon customer acceptance, and the

new policy meant that six more sales were recorded in the first quarter.

## French success

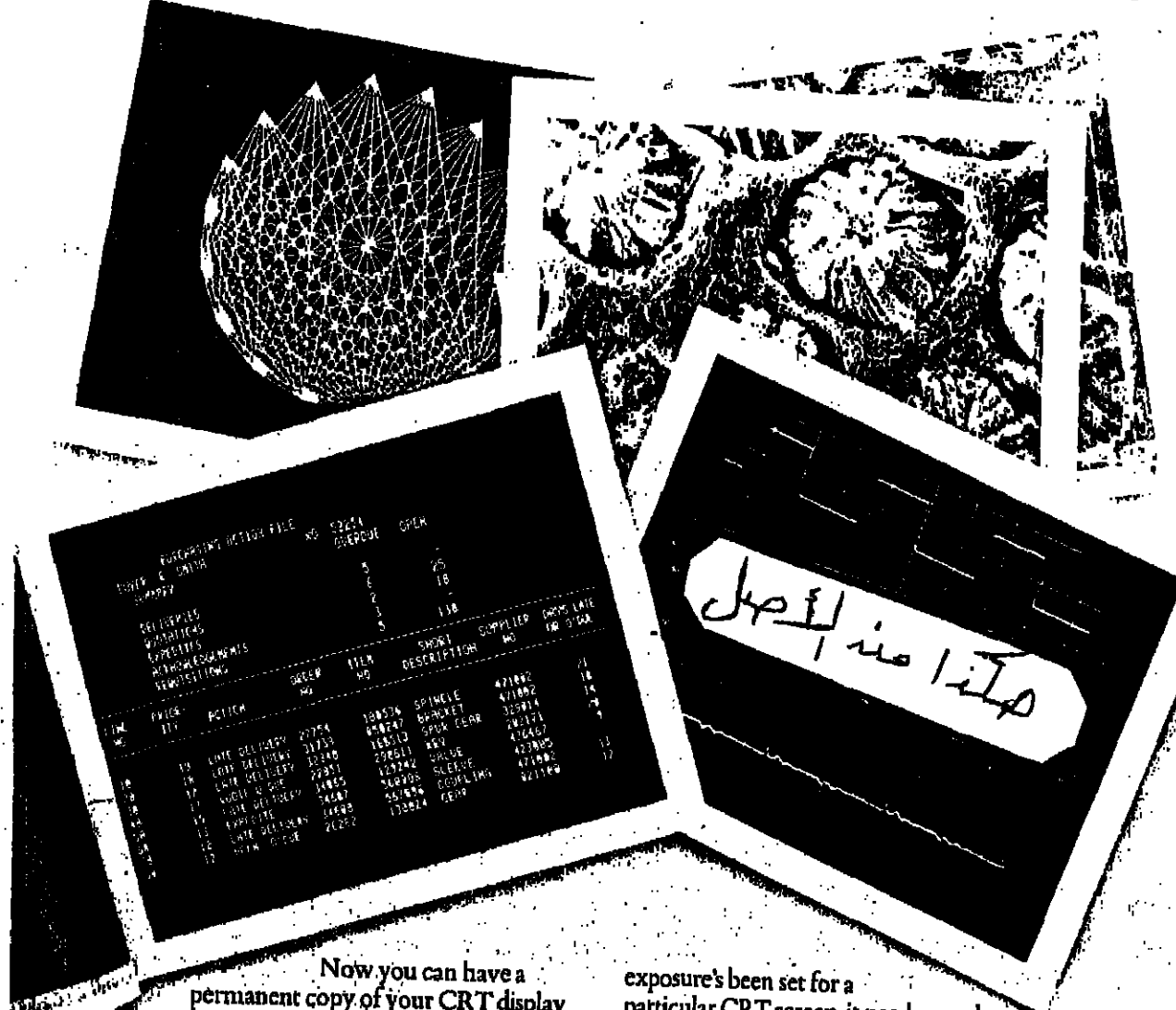
PENETRATION of the French market by ICL has been helped enormously by the success of the 2803 there. Out of 260 systems installed, 65 have gone to first-time users, 138 replaced machines from ICL's competitors and only 67 were ordered by existing ICL users.

## World Cup system

A COMPUTER-BASED telex system will aid the running and co-ordination of the World Cup finals to be held in Argentina next month. The system is based on four Eltex minicomputers at centres in Buenos Aires, Rosario, Cordoba and Bahia Blanca, and in all has 48 terminals throughout the country.

The equipment, worth about £2.25 million, was bought from Frederick Electronics Corp of the US, by Entel, the Argentine telecommunications authority.

## RECORDS IN RECORD TIME.



Now you can have a permanent copy of your CRT display in seconds with a Polaroid Instant CRT recording system.

There are purpose built systems, like the Polaroid CU-5 camera. Or if you are already using a conventional camera you can probably adapt it to take instant pictures by using one of our range of film backs.

Either way, you'll get instant, high definition photographs for study comparison, pass along information, reproduction or filing.

**How the Polaroid System Works**  
The Polaroid CU-5 hard copy camera, for example, takes a range of hoods to fit virtually any CRT screen size.

You simply hold the camera with the correct hood, flush against the screen. This stops glare and sets the CU-5 camera the precise distance away from the screen. There's no manual focusing.

Just cover the shutter and the record is made. The instant Polaroid record is ready in your terminal. Over

exposure's been set for a particular CRT screen, it need never be altered.

## The Range of Polaroid Instant Films for CRT Records

Although there are 13 different Polaroid instant films covering all kinds of applications in colour and black and white. And with a range of speeds to cope with a wide range of light intensities.

**The Applications**  
Polaroid instant records can be produced from many types of screens, including computer terminals, closed circuit TV and oscilloscopes.

For more information on Polaroid Instant CRT recording systems, or to arrange a demonstration, ring Ray Taylor on Freephone 2143.

**POLAROID**  
CRT IMAGE RECORDING IN SECONDS

Ray Taylor, Freephone 2143

## Say cheese — provided it's British

WITH reference to your report of the conference on the subject of microprocessors, in which you report quite correctly, that I suggested cheese was as good a word as any to describe a microprocessor, and which remains popular, I am pleased to hear that I was only referring to British cheese.

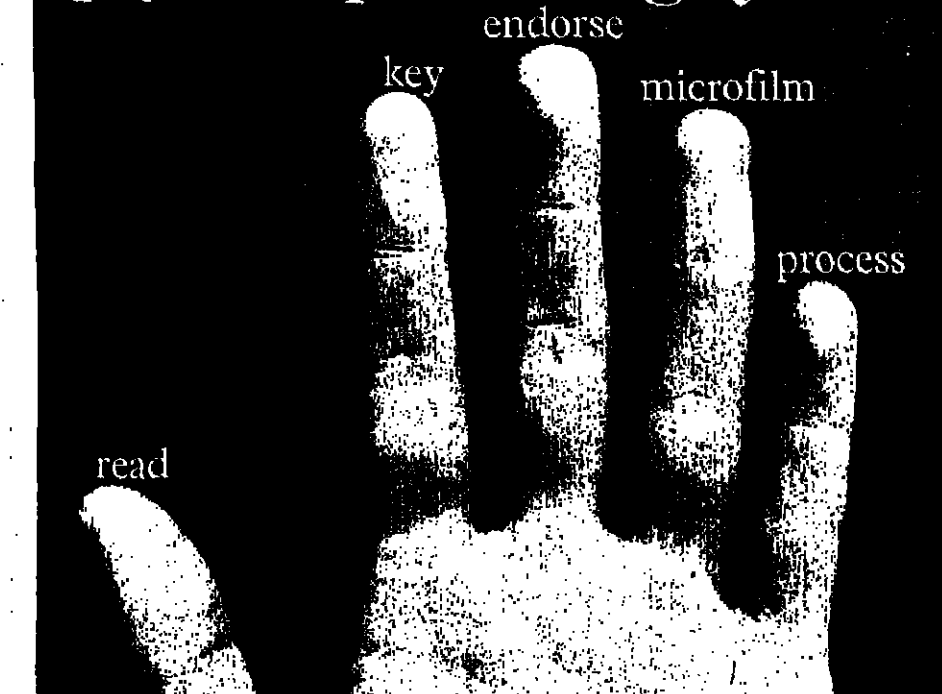
BARRY HICKMAN  
Director of Research  
AETEC  
London

If he were to remove the shift allowance from our salaries we would notice how low paid we operators really are.

If operators would like to form their own trade union, I would be only too glad to organise meeting.

P. BRIDGES

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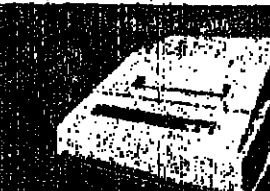
Name .....

Position .....

Company .....

Address .....

Find out more - ScanData have got the one system you need. CW 5





## MICRO NEWS

# ITT enters the 'personal' market

ITT Consumer Products Division confirmed last week that it is to enter the personal computer field, selling Apple II machines (CW, April 27).

The announcement was made at a press conference to introduce the company's activities in a wide variety of TV-based applications areas, including videotext, teletext and video cassette recorders.

To be known as the ITT Computer, the equipment is scheduled to appear in the UK in the autumn, and a minimum configuration machine, 4K bytes of RAM, is expected to sell at about £900.

ITT demonstrated the system working with a speech recognition board from Heuristics. This will be available as one of a range of optional extras and memory configurations. The Heuristics board specially de-

veloped to fit the Apple machine, is already available from Personal Computers in this country for £165 and offers a 32-word speech recognition capability.

In the long term, one of the most interesting parts of the agreement between ITT and Apple is not the actual sale of Apple IIs by the giant multinational — though it is not insignificant that such a large company should feel the need to have a presence in the market. It is that the two companies are talking seriously of a technology licence agreement that would give ITT the right either to buy unpackaged board systems, or even build systems from the board level up, and then package them itself.

One of the prime reasons that ITT has decided to enter the personal computer field is the fact that in the US, the 1978

market for such systems is expected to top 100,000 units, and that all the pointers show that Europe will inevitably follow suit.

The company's market intelligence indicates that around 5,000 systems, with a total value of around £4 million, will be sold in the UK this year. By 1982 however, it expects to see some 225,000 systems sold.

It sees four main market segments making up this sales growth. The biggest sector it sees is the home user, purchasing a system for such applications as entertainment, household accounting, home teaching, etc. It sees this as a separate category from the hobbyist.

The other two sectors are in education, and the professional and small business user.

## SOS micro from RCA

ONE of the first generally available microprocessors manufactured in silicon on sapphire process has been made available by RCA Solid State.

Known as the CDP 1804, it is a direct upgrade of the CMOS-processed CDP 1802 device using the same instruction set, but offering the advantages of operating speed inherent in the SOS technology.

While capable of working in 4 to 10 volt power supply range, the device will operate at 8MHz clock frequency at a steady 5 volts. This gives an instruction time of 2 microseconds.

Three options on internal memory configurations are available. These are 1K byte of ROM and 32 bytes of RAM, 2K bytes of ROM and 64 bytes of RAM, while the third has no ROM and 128 bytes of RAM.

First deliveries of the part are expected by the year end, and RCA is already working with customers on memory configurations and ROM mask layouts. One of the early US customers is expected to be Chrysler, which wants the part for its 1980-model cars.

Edited by Martin Banks

## Intel gives more details of the 8086

PRIOR to its June Fair, Intel has released more information about its new 8086, 16-bit microprocessor, which is expected to be one of the highlights of the event. The details come from the company's house journal, Intel News.

As indicated previously (CW, November 24, 1977), the 8086 is software compatible with the 8080 and 8085 devices when a software translation package is used. It provides all the features of the 8080 plus 16-bit arithmetic, interruptable byte string operations and improved bit manipulation.

It also includes such microcomputer features as re-entrant code, position independent code and dynamically relocatable programs.

Using the HMOS process technology, the device has been packed into a chip 225 mil square, and contains the equivalent of 29,000 transistors.

Internal clock rates are 5MHz on standard chips and 8MHz on selected chips, which means that programs will generally be 12 times faster than on the 8080. The enhanced instruction set also means that programs will generally be between 10 and 25% shorter.

The instruction set will address operands in several different ways. In general, operands in memory may be ad-

ressed either directly, with the 16-bit offset address or indirectly, with base and/or index registers added to an optional 16-bit displacement constant.

It will offer several variations of the four basic arithmetical operations. Both 8 and 16-bit arithmetical operations and both signed and unsigned arithmetic are provided, with standard 2's complement representation being used to distinguish signed values.

For handling program flow, two basic varieties of calls, jumps and returns are provided — one that transfers control within the current code segment and one that transfers control to an arbitrary code segment, which then becomes the current code segment.

The device has a bus interface unit, which maintains a 8-byte fetch-ahead instruction queue. The execution unit extracts bytes from the queue, and executes them fast enough to eliminate dead time between instruction fetches. As many as two single-byte instructions can be executed within the time for one memory cycle in a fully overlapped fashion.

Since the execution unit functions in parallel with the bus interface unit's activities, it is largely unaffected by direct memory access operations, which also occur on the system bus.

## High speed addition to Pace family from NS

A HIGH-SPEED addition has been made by National Semiconductor to its Pace family of 16-bit microprocessors that sports an interrupt structure addressing modes and logical capabilities normally associated with minicomputers.

Said to be between 10 and 30% faster than present generation 8-bit micros such as the 8080, the device is intended to meet applications where a 16-bit word length is required in collaboration with the low costs inherent in a one-chip, fixed instruction device.

All the 45 instructions are single word, 16-bit format, and the device is capable of operating on both 16 and 8-bit data words.

Known as the INS8900, the chip contains status and control circuitry, conditioned branch sense circuitry, interrupt logic and a portion of the clock generation circuitry. The two external functions required are a simple, single-phase clock and data buffering, both of which can be provided with off-the-shelf parts. By adding a ROM

and between one and four RAMs, all with on-chip address latches, the company states that a complete system can be implemented with no more than five packages.

A built-in microprogram controls the device during instruction fetch and execution, the microprogram being stored in a programmable logic array not accessible to the user.

For internal storage there are seven 16-bit registers, four of which are directly available to the user for data storage and address formulation.

The 8900 uses a unified bus architecture in which address and data transfers occur over the same 16-lines. Like several other devices, it also has an on-board I/O capability, where the flag output and jump commands can be used together to form a serial I/O port.

Software compatibility is maintained with the rest of the Pace family of processors and the same software development aids, including the Pace Universal Development System, can be used.

## PoS stock control system

POINT of sale stock control is the prime application area for a new micro-based small business system developed by Ego Computers. With software that has been developed in co-operation with the motor trade, the system comes with a growing range of applications packages for the small retail, service or manufacturing business.

The basic system is supplied with 32K of memory, together with twin floppy discs, one video terminal and a 120 chips matrix printer. This can be expanded to support up to 128M bytes of memory, 16 terminals, 16 printers and 19M bytes of floppy or hard disc.

The operating system uses mainframe software technology to provide a real time, multi-programmable virtual operating system that places no practical

limit on the size of program that can be run, irrespective of memory size.

Pricing has been set by Ego at a competitive level, with a basic system complete with point-of-sale stock control software, retailing for £8,500.

**Static CMOS RAM from Nippon**

WITH the lower power requirements of battery operated systems in mind, NEC Electronics (Europe), the European sales arm of Nippon Electric, has introduced a 1K bit static CMOS RAM, called the UPD3191.

Organised as 256 words by 4 bits, the 22-pin device has TTL compatible inputs and outputs. Normal operation requires a 3.3 volt supply, but the device can retain data down to 2 volts.

# Still growing—with more firms, and more visitors

IT is a feature of all computer industry shows that the smallest companies get the most mileage out of their investment — and Compec Europe 78 was no exception.

The Computer Weekly-sponsored exhibition which ran from Tuesday to Thursday of last week at the Centre International Rogier in Brussels, kept up its growth record, with more companies exhibiting and more visitors attending than ever before — 5,602 in all. And while the large, well-known companies were broadly satisfied with the outcome, most of the little ones were ecstatic.

Among British companies in the latter category, Garage Management Services of Woking was enthusiastic at the response to its products from potential non-exclusive distributors in the Benelux and other European countries.

Starting out to provide payroll services to oil companies and to manage garage sites, GMS turned its hand to microelectronics four years ago, and developed a self-service console for petrol pumps.

Compec Europe was chosen as the launch-pad for a new communications product, a low-cost, attractively-styled telex machine for the home.

The Minitec-X is built around the GMS Intel 4040 4-bit micro-based processor, and is aimed at journalists working at home, building sites and similar situa-

## TIM PALMER REPORTS FROM BRUSSELS ON COMPEC EUROPE

This unique British product is controlled by three Intel 8080s and features two printers (Dialo HyType 2 or Qume at present), one of which prints the account name on the cheque, while the other adds the account number, branch code and sort code in high definition Magnetic Ink Character Recognition symbols. OCR-A and B are available, CMC-7 will follow shortly and other codes will be added later, Rochford Thompson produces its own daisy wheels for the printer.

Dissatisfied with the standard ribbon cartridges supplied by the printer companies, Rochford Thompson has designed its own reloadable ribbon carrier which

Minifloppies feature in the Rair Black Box, heavily promoted on the Compec stand, although not featured among the exhibits. The Black Box is a microcomputer built around the Intel 8085, and features two minifloppy drives.

Rochford Thompson was on the look-out for European agents for its revolutionary Wescode 1240M cheque printer and encoder.



Exhibiting for the first time at Compec Europe, Ternd Communications featured the new 800 keyboard send-receive terminal, which is also available in automatic and receive only versions, and runs at up to 30 cphs. For the communications engineer, the company featured the new Test Set 1-8-1, which includes synchronous and start-stop sequences for testing modems and multiplexers.

## Fastest printer makes an impact

PLENTY of products from US and UK companies were on display on the stands of Benelux distributors at Compec Europe, and some of these companies also showed significant products of their own development.

Datus CD1 of the Netherlands had two notable items on display: the Documentation DOC-3000 line printer, and the General Robotics MVT/X3 desk-top computer.

Running at 3,000 lines a minute being impact technology, the IBM 1403 and 3811 compatible DOC-3000 is claimed to be the fastest impact printer in the world.

Why, it might be asked, should anyone want one of these machines when laser printers like the IBM 3800 run so much faster? The answer lies in the price — about £80,000 for one. The figure falls rapidly for quantities — and the need to back up laser printers in important applications. The laser printer can run four to six times as fast, but its price is much higher.

The MVT/X3 (offered in the UK by Gamitex Associates) includes in a single desk-top unit, a 12 lines by 40 columns Burroughs plasma display, a

Honeywell keyboard, three minifloppies from Micropolis, a 132 column 80 cphs Centronics printer, and a DEC PDP-11/02 microcomputer.

The minifloppies offer over a Megabyte storage in total, and have a better than 10 millisecond read-write time track to track, compared with the industry average of 20 milliseconds.

Hawker Siddeley Dynamics Engineering is determined to become a major force in microcomputer control applications, and featured its 8080-based Sequel user programmable plant and process control system, which was designed to meet the intractable problem that process engineers are suspicious of computers and dislike handing over their applications to specialists for programming.

Vector International of Brussels sells the Sequel system in the Benelux market, and also showed its own 8085-based microcomputer card, which it has assembled into a number of products including an electronic cash register. The company's biggest contract so far worth £150,000 is for systems to control the loading of petrol into tanker trucks.

makes the task of changing the ribbon much simpler, and 200 a month are in demand in the US.

Seven of the machines have been sold to Australia, and two have been taken by Barclays Bank, which will follow up with a big order after successful trials.

Prices for the printer, which is backed by a floppy disc, start at £20,000 to £25,000 and drop sharply for quantity orders.

New from Trivector is the addition of hardware floating point to the Triton 3 microcomputer system built around three Zilog Z80A micros. The company was also giving visitors a sneak preview of the TLL ledger system which runs on Triton 3 and will be launched shortly.

Transdata's hottest properties at Compec were the new 318 paper-tape code converter, which is programmable and uses an 8080 so that any code can be handled, and the 316 extra wide keyboard printer terminal, which prints across 163 columns.



## Here, there, and everywhere

COMPEC would not be complete without some light relief on the Modular Technology stand, and Repko BV, the company which distributes Modular Technology's products in Benelux, kept up the tradition.

Repko was in charge of the stand information system, and last year used a PDP-11 to control the message distribution. This year, at the last minute it was found the DEC mini would not be available, so a personal computer was hastily acquired from the MRL hobby shop in Belft.

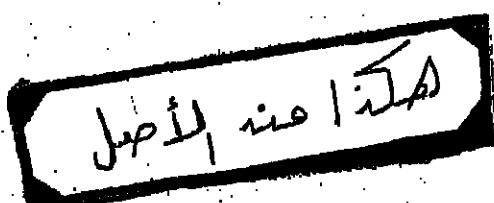
Marie Repko (at the terminal in the picture above) quickly wrote a program for the Motorola 6800-

based SWTP computer which enabled the same message to be distributed to 20 different display and printer terminals around the exhibition.

The minicomputer fully lived up to its 'ubiquitous' tag, turning up on most of the stands at the show, and Repko, which received its first four interlaser packet interface testers from Modular Technology, lost three of them to exhibitors who saw the devices in use for installing the modems for the information system — and promptly bought one.

Three hundred minicomputers were sold in Holland last year, and another 600 are expected to go this year.

# COMPUTER WEEKLY'S NEW JOURNAL IS TURNING OUT TO BE A LOAD OF PULL.



## LAUNCHED SEPTEMBER 1977-ALREADY AVERAGING 2500 ENQUIRIES AN ISSUE.

This big product-news journal, within six months of its launching, is itself big product news! Our latest issue received 3,500 enquiries and look where they're coming from! A precision-planned readership comprising 18,000 key computer executives in the U.K. and 24,000 in Europe... while terms of circulation control have now been extended to include 6,500 electronics design engineers, most of them specifying equipment for OEM manufacturers, the rest DP managers and Systems House executives with direct purchasing power.

Each month Computer Products International publishes a special supplement covering a particular range of hardware. In May, we're spotlighting Microprocessors. In June, Teleprocessing Monitors, July Plotters and in September 8-bit Minicomputers.

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It makes life simpler for the programmer; frees the operator from all of the inherent hazards of manual control of tape libraries.

CA-DYNAM/T makes sure... automatically... that the right tape is input — and that only valid scratch tapes are mounted for output.

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Plus... lots of useful features to streamline tape processing operations, among them:

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- DOS, DOS/VS release independent — no modifications to JCL or programs required —
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The Scope CTM 70 Model 900.

## Scope in UK for a West German range of systems

FACILITIES for multiprocessing, object code compatibility and upgrading were the main reasons behind Scope Data Systems' decision to market the West German-made CTM 70 range of small business systems in the UK.

Scope had for two years been looking for a system with these attributes, says managing director Geoff Poskitt.

The four-strong range is based around a 400 nanosecond processor that can be upgraded in the field from 16 to 128K bytes of MOS memory in 16K steps. Languages available include Basic and Macro Assembler.

The basic unit, the Model 600,

has a keyboard, a 1,920 character VDU terminal, a 140 chps matrix printer and ledger processor and a typical configuration costs £11,000.

The Model 700 includes up to four floppy disc drives with a capacity of up to 636K bytes per drive. The Model 700 can be used for word processing applications, and has an average price of £13,000.

The Model 800 costs about £20,000.

Multiprocessing is the key attraction of the Model 900, which can have up to 16 video terminals, each with its own processor. Prices range from £25,000 to £100,000.

## Automation will demand human flying squads

AUTOMATION in industry will not necessarily lead to mass unemployment, but it will require a fundamental change in human attitudes to job training and retraining to allow the formation of "human flying squads" to cope with breakdowns.

This view was put forward by Robert Bass, of British Sugar in a lecture at the Institution of Electrical Engineers in London.

He traced the history of process control in industry, pointing out the distinction between continuous processes, which had been easy to control and manage, and batch processes which had invariably caused industry some headaches. Initially, the monitoring of such

processes fell to an elite of instrument engineers, until the advent of the microcomputer. Such equipment could monitor and control many batch processes, but even though extremely reliable, it did break down, and the result was often catastrophic.

Now, with the advent of hierarchical systems based on the use of one microcomputer per system, the engineers developing them had an even greater responsibility to industry to ensure that they worked.

Bass pointed out that the systems could now, theoretically, run themselves; but inevitably they would break down, so there would still be a need for human intervention. "After

all", he said, "all companies are in business to make money, and the losses that can be made out of even a short process breakdown can be enormous."

He indicated that industry is beginning to think in terms of the assessment of an employee's flexibility to work changes as a possible criterion for employment, and that this flexibility had to be part of a more general atmosphere towards expecting change.

These employees would not be employed to run the equipment while things were going well, he indicated, but would be there to keep the processes running when the control equipment failed.

## NEWS IN BRIEF

### Micro impact on universities

THE Computer Board is studying the impact of the microprocessor on university computing facilities.

The working party, under Dr Jim Alty of Liverpool University, is expected to provide an interim report soon and is likely to conclude that university computer departments should play a central role in ensuring that exploitation of the wide potential of micro applications is effectively co-ordinated.

### Waiting list

THE borough council of Sandwell, West Midlands, is considering computerising its council house waiting list, with terminals in all area housing offices, supplying information to officials and families. But some councillors doubt that the £20,000 expenditure would lead to any reduction in waiting time.

### Takeovers blocked

SHAREHOLDERS in Control Data have narrowly approved two changes in the articles of association which will make it more difficult for another company to succeed in a takeover bid. They also rejected a motion sponsored by church organisations which would have prevented CDC from trading in South Africa, only 4 per cent of the shares being voted in favour.

### Cost saving

A RE-USABLE ribbon carrier has been developed for Qume and Diablo daisy wheel printers allowing the use of cheap replacement ribbons that come without a cassette. This saves the cost of the throw-away cassette, which is as much as the ribbon itself. The user loads the new ribbon into the carrier, then fits the carrier to the printer in the normal way.

### DG launch

TWO industry compatible magnetic tape subsystems have been introduced by Data General for use with Nova and Eclipse minicomputers. Called the Model 6026 and Model 6031, both run at 75 ips. Recording densities are 1800 and 800 bpi on the 6026 and 800 bpi on the 6031.

### Tornado prediction

SCIENTISTS at the US National Oceanic and Atmospheric Administration's Severe Storms Laboratory in Oklahoma have devised a system using Doppler radar and two computers that can predict the formation of tornadoes before they form. The Doppler radar senses the size and movements inside thunderclouds of mesocyclones, the precursors of tornadoes, and these are displayed on colour VDU.

### Court system

A COMPUTER system designed specifically to meet the demands of magistrates' courts has been introduced by ICL. Called the Magistrates' Courts System, it can handle the automatic production of fines and other payments received, and of compensation paid out.

## Nato to call for bids

● From front page

perience from military work in the UK.

By the time the calls for bids are made, several of the competing firms will probably have aligned themselves with partners in consortia. Leasco Software says that it is currently in the process of looking at suitable consortia to get involved with.

It is understood that it could involve an investment of about £250,000 merely to put together a bid.

The competition for the Nato contracts will be extremely fierce because even though most of the work will be in Europe, large US contractors not normally active on this side of the Atlantic will be entitled to bid by way of the massive US involvement in Nato.

A Nato spokesman in Brussels revealed that the command and control network was discussed at the last conference of member country management directors in Brussels about two weeks ago.

But whichever firms or consortia win the contracts, work is not expected to start until next year.

## South Africa seeks to end reliance on foreign 'technological blackmail'

By Eamond Frank

A LEADING South African computer expert believes that the country can minimise the danger of "foreign technological blackmail" through the rapid development of local hardware manufacture.

Morris Cowley, chairman of

Amercos Computer Services, the Anglo American Corporation's in-house computer operation, and chief executive of its commercial computer company, Computer Sciences, says three logical steps must be taken to lessen the country's dependence on multinational suppliers.

The first step, he suggests, should be the creation of a domestic computer leasing operation to remove the financial burden of funding rentals from local manufacturers.

Cowley believes that the second step should be the development of a "mini-computer" manufacturing industry financed through South Africa's Industrial Development Corporation to reduce dependence on the multinational suppliers of mainframe units.

South Africa, he says, should follow the example set by both Israel and Japan, which broke into computer manufacturing via "midsize".

Clusters of smaller computers, he adds, can be viable substitutes for large mainframe units.

The third step advocated by Cowley is the establishment of a "third party" maintenance operation geared to servicing existing mainframe units if and when the multinationals decide to abort their South African operations as a result of political pressures.

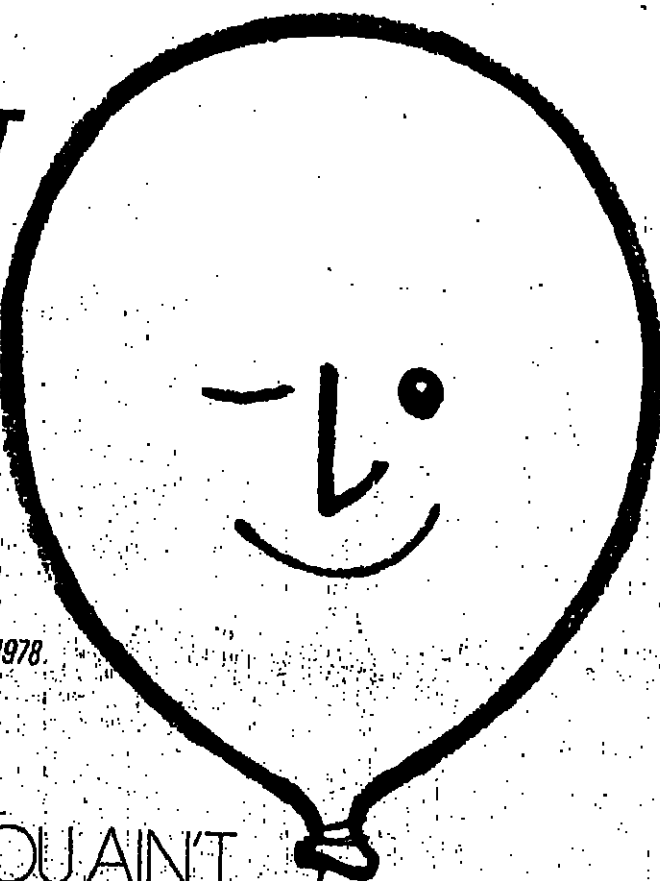
Although he does not believe that the US will impose a general embargo on computer sales to South Africa, he says that the country depends too heavily on computers to have its future crippled by the whims of foreign governments.

# LOOKING FOR PEOPLE WHO ARE BUYING COMPUTER SYSTEMS?

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\*N.B.R.C. Businessman Readership Survey 1978.



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## APPOINTMENTS IN IRELAND



# Recruitment in the Emerald Isle

By Ray Hewlett

Ray Hewlett, managing director of Derritron (Eire) Teoranta (Cybergraphics), looks at two organisations in Ireland which encourage new industries to settle in that country.

IT is sometimes difficult to equate high unemployment with a surplus of jobs over applicants. It is a known fact that in the UK there are 1.5 million unemployed, yet the computer industry has "jobs chasing people".

The NHS cuts back in expenditure yet the computer installation within this, the country's largest employer, is 12% below minimum requirement to operate and maintain a minimum service for the patients.

This probably results from school curriculums still biased towards the arts education, arranging courses such that only one per cent of them include courses which could be useful to a prospective programmer.

Take all these problems, add to them a community more used to horticulture than general industry coupled to years of an accepted high level of unemployment, at present 10% of the employable community, and you have some of the problems associated with recruitment in Eire.

Yet there is probably as much and, in some cases, more help given to attract companies to set up business, recruit and train staff in this part of the world than any other similar areas within the UK.

This article will discuss the two organisations within Eire whose job is to encourage new industries to settle in that country, and examine the system they operate for recruitment and training.

The total workforce in Eire has changed little over the past one and a half decades. In 1963 it numbered 1,122,000, 1973 — 1,118,000 and 1977 — 1,200,000. In 1973 some 59,000 were employed in the service industries which at that time was an increase of 10,000, and it is believed that this upward trend of people employed in services such as computer bureaux and allied industries is continuing to grow.

There are two organisations responsible for promoting industrial development: Industrial Development Authority and Gaeltarra Eireann.

IDA — this authority was formed in 1949 as part of the Department of Industry and Commerce, but is now an autonomous state body. In 1977 it was allocated by the government £85 million to spend on industry. The IDA's main task is to encourage home industrialists and industrialists from abroad to set up manufacturing operations in Eire.

The IDA programme also includes service industries such as engineering consultants, process engineers and computer software houses provided they operate internationally or have experience not available in Ireland. These are considered for assistance in setting up offices for foreign work, many of which qualify for tax relief.

The Authority administers all the financial incentives available to industry in the greater part of Eire. Gaeltarra Eireann — this development organisation is responsible for the economic development of the Gaeltacht areas, which are those parts of Eire where Irish is the commonly spoken language.

Besides these financial aids, Gaeltarra can participate in the share capital of a company from a minimum of 20%.

Both authorities feature extremely efficient training schemes, and the IDA provides training grants of up to 100% of the cost of agreed training programmes for workers in new industries.

These incentives include: a) grants of up to 60% for building and new equipment; b) up to 100% training grants with assistance provided in recruitment selection and training; c) low rent factories built to promoters' specifications; and d) exemption from tax on profits generated by exports.

Besides these financial aids, Gaeltarra can participate in the share capital of a company from a minimum of 20%.

Both authorities feature extremely efficient training schemes, and the IDA provides training grants of up to 100% of the cost of agreed training programmes for workers in new industries.



Cantrell & Cochrane  
DUBLIN

C & C is the largest Soft Drink manufacturer in Ireland, and is jointly owned by Allied Breweries and Arthur Guinness & Son.

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We are committed to further systems development, particularly in on-line order processing/distribution. We are currently examining the feasibility of a communications network.

To assist us in our plans, we require the following additional staff

### (a) Systems Analyst — To £6,100

He/she should be able to demonstrate the design and successful implementation of a major system. It would be desirable that he/she had knowledge of distribution.

### (b) Analyst/Programmer — To £5,200

He/she should have worked and assisted in the design and successful implementation of a major system. 2/3 years' experience in Cobol is essential.

### (c) Programmer — To £4,290

He/she should have at least 2 years' solid experience with Cobol.

Please forward your curriculum vitae to

Personnel Manager  
Cantrell & Cochrane (Dublin) Ltd.  
Kilmore Park West, Dublin 10  
Telephone: 366611

## Programmers or Programmers/Analysts

£5500/£6000

Southern Ireland

Our client, a manufacturing company with a recently established ultra modern plant, within 1 1/2 hours drive from Dublin, requires experienced Programmers for their up-to-date installation.

Currently programmes are written in RPGII but our client requires a minimum of 2 1/2 years' programming experience in either RPGII or COBOL. Applicants will be given training where necessary. The opportunity exists to move into Systems Analysis for the Programmers with a good manufacturing background.

The company offers these outstanding opportunities to secure very interesting work, with great scope for successful candidates who have the initiative to progress within an expanding department. In addition to a competitive salary and excellent working conditions in a new installation there is a life assurance and pension scheme. Assistance will be given with relocation costs where applicable.

Please write or telephone Gerald Delemere at the Dublin office (0001 782170/88) or Graeme Ridler at Kingston 01-549 3212.

## Software Engineers/Programmers

£5000-£7000

South Coast of Ireland

The job will involve working on the development and manufacturing of process control systems. One of these systems, the DECADE System is intended mainly to control Plastic Extruders. It consists of as many as line systems as there are extruders to be controlled, all linked to a central data terminal. Each on line system, plus the intelligent data terminal incorporate a PDP11 computer. Two to four years' experience of Assembly level programming is necessary for these positions. A B.Sc. would also be helpful as would experience of any of the following: Mini Computer or Real Time programming, Process Control applications or Digital Computing.

These positions are in a new plant and therefore offer genuine scope to the successful candidates to build and enlarge their careers. On site commissioning is involved so there will be opportunities to travel in Europe. A competitive salary will be negotiated which together with excellent conditions of employment, attractive fringe benefits reflect the importance of these positions within the company. Relocation expenses will be paid where applicable.

# Central Computing Consultants

KINGSTON: 44 Wood Street, Kingston upon Thames, Surrey, England. Telephone 01-549 3212 Telex 27950  
DUBLIN: Canberra House, 24 Lower Leeson Street, Dublin 2. Telephone 762170/762188/765692





## APPOINTMENTS IN IRELAND

### RANK XEROX REQUIRES SENIOR PROGRAMMER £5500 plus

We have a vacancy for a Senior Programmer in our Computer Department based at Glasnevin in Dublin. Main responsibilities include writing and maintaining computer programmes on an IBM System III Model 12, using Cobol and R.P.G. II and providing technical advice to the D.P. Manager. Candidates should have at least three years programming experience mainly in Cobol and preferably some System III experience.

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Ms M. Gannon, RANK XEROX (Ireland) Limited, Glasnevin Industrial Estate, Finglas Road, Dublin 11, Ireland. Tel. Dublin 301833.

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### Programmer Analyst

B+1 is a major Irish Company involved in International Transport operating Car Ferry services across the Irish Sea and a comprehensive range of freight services to Britain and Europe. The Company is presently engaged in developing an On-line Reservations system incorporating a communications network servicing the various Passenger and Freight locations. The Hardware configuration comprises twin PDP 11/70 processors each with dual 67/MB Disks. The system, when fully implemented, will have in excess of 50 VDU terminals.

An experienced Programmer Analyst is now required to join the Computer Implementation team. This person will be

based in Dublin and will be expected to contribute to the design, evaluation and implementation of Planned Computer Projects. In addition, this person will be primarily responsible for the day-to-day operation of the application software.

A detailed knowledge of Fortran is essential, and whilst a knowledge of Assembler is desirable, candidates ideally should have experience of PDP systems using RSX 11M operating system. However, applicants with good commercial experience of real time On-line systems will be considered.

This position carries an attractive salary and fringe benefits include free travel facilities.



Applications marked "Computer" should be addressed to Mr. B. O'Rourke, Personnel Manager B+1 Line, 12 North Wall, DUBLIN 1.

### BELFAST CITY COUNCIL City Treasurer's Department

Recruitment for the position of Senior Systems Analysts has been initiated on the basis of open competition. All levels for these computer personnel.

The applicant will be responsible for the design, development, testing, implementation and maintenance of computer systems. The successful candidate will be required to have a minimum of five years experience in the design, development, testing, implementation and maintenance of computer systems. The successful candidate will be required to have a minimum of five years experience in the design, development, testing, implementation and maintenance of computer systems.

**A. SENIOR SYSTEMS ANALYSTS**  
Salary Scale £10,000 - £12,000 p.a. (dependent on experience)

**B. SYSTEMS ANALYSTS**  
Salary Scale £8,000 - £10,000 p.a. (dependent on experience)

**C. SENIOR PROGRAMMER**  
Salary Scale £8,000 - £10,000 p.a. (dependent on experience)

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## MEASUREX (IRELAND) LIMITED

A leading manufacturer of digital computer integrated measurement and control systems, continues to expand its operations. Measurex manufactures all of its systems for the European market in Ireland. In order to further serve the needs of this market and broaden the base of its Irish operations, an Engineering Group has been established in Cork, Ireland.

The Group's responsibilities are as follows:—

Manufacture of all computer software and control products across Measurex's product line in the Paper, Pulping, Energy Management, Rubber, Plastics and Metal Industries.

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The following job opportunities exist:

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Salary up to £9,500 per annum

**Duties:**  
To work initially as a member of an engineering team involved in specification, planning, implementation and commissioning of computer-based digital measurement and control systems for the Pulp, Paper, Energy Management, Rubber, Plastics and Metals Industries in Europe. Rapid advancement possibilities to Project Leader with suitable qualifications and experience. Job will focus on control applications knowledge as implemented in Software for industrial control systems. The successful candidate will hold a good Engineering or Science degree in a relevant discipline with several years' varied experience of the analysis and control of industrial processes. Experience in the use of digital computers is highly desirable. Travel throughout Europe will be required.

### CONTROL ENGINEERS

Salary up to £7,000 p.a.

**Duties:**  
To work as a member of an engineering team involved in specification, planning and commissioning of computer-based digital measurement and control systems for industrial processes. The successful candidate will hold a good Engineering or Science degree in a relevant discipline. One to four years' experience in the field of process control in the Paper, Rubber, Plastics or Metals Industries desirable. Experience in the use of digital computers is highly desirable. Travel throughout Europe will be required.

Reply requesting application forms to:—

Colin McNaught  
Engineering Manager  
Measurex (Ireland) Ltd  
Engineering Department  
Mallow Road  
Cork  
Telephone: 021-58899

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Salary up to £9,500 p.a.

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To work as a member of an engineering team involved in the specification, planning, implementation and commissioning of the software for computer-based digital measurement and control systems for the Pulp, Paper, Energy Management, Rubber, Plastics and Metals Industries in Europe. Rapid advancement possibilities to Project Leader with suitable qualification and experience. The job will focus on programming/software knowledge of real time process control systems with an applications bias. The successful candidate will hold a good degree in Engineering or Computer Science with several years' varied experience of real time computer systems. Travel throughout Europe will be required.

### SOFTWARE ENGINEERS

Salary up to £7,000 p.a.

**Duties:**  
To work on the development and manufacturing of computer-based digital measurement and control systems in the Paper, Rubber, Plastics or Metals Industries. To be involved in the installation and start-up phases of these systems. The successful candidate will hold a good Engineering or Science degree with course work in Digital Computing and Computer Programming. Experience in assembly level programming or Real-Time Computer systems is highly desirable. Travel throughout Europe will be required. There is a contributory pension scheme and a bonus scheme. Relocation allowances will be payable if appropriate.

### NORTHERN FEATURE MAY 25

Advertisers are reminded that there is a recruitment feature highlighting career opportunities in the north of England on May 25th.

To secure space in this important feature contact:

Owen Kelly 061-872 4211 or  
Paul Windridge 01-261 8454

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ESTABLISHMENT OFFICER  
University College  
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Currently involved in an extensive installation programme, they require bright and experienced personnel with the following background:

- 2/3 years' experience with advanced digital techniques on L.S.I. including microprocessors
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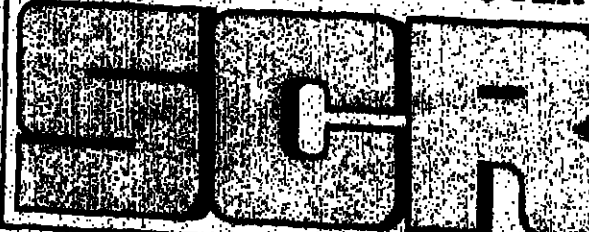
Candidates should be able to offer a minimum of 2 years' systems and programming experience, and experience of retail systems, COBOL or PLAN would be advantageous.

Excellent conditions of employment apply, including assistance with relocation expenses where applicable.

Initial interviews will be held in Dublin, Manchester, Birmingham and London.

**CONTACT:** Tony Deane, 061-833 0427 or 061-682 9756 outside office hours.

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Respect, Equity and Law House,  
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**MANCHESTER** 061-433 0427  
Respect, Equity and Law House, The Pannage, Manchester M14 6PL  
**LONDON** 01-975 0671  
Respect, Equity and Law House, 102, Mark Lane, London EC3A 7PF



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The persons appointed will:—  
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b) be capable of working on his/her own initiative and communicating effectively at all levels of management.  
Experience of on-line systems would be an advantage.

- 2. Programmers**  
The successful applicants will:—  
a) have at least two years' experience of COBOL or IBM Assembler language;  
b) be capable of assuming responsibility for programming projects.  
Experience of on-line programming and/or systems programming would be an advantage.

Salaries and conditions are competitive and are in line with what one would expect from a leading industrial company.

Applications in writing, or telephone for application form, to:—

F. O'Sullivan,  
Computer Services Manager,  
Cement Roadstone Holdings Ltd,  
Saggart,  
Co. Dublin, Ireland.  
Telephone: (01) 514144/503444

Insight Marketing & Personnel Consultants  
33 Mespil Road, Dublin 4. Telephone 681166, 681277





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woman who comes to see us get the contract that's to their taste. And while we're on the subject of exotic dishes, we should point out that we can just as easily offer you a contract in a part of the world where home cooking means Bauern Bratwurst or Osso Bucco, as in the more familiar territories of Yorkshire pudding and jellied eels.

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If your present responsibility is to implement commercial systems and you feel that the next challenge is to join a sales support team then our client is currently able to offer such a position. The company manufactures mini computers and has enjoyed a steady growth over the last few years, a pattern which is expected to continue into the future. This position requires that candidates have a good grounding in basic d.p. disciplines as the company market a wide range of both tailor made systems and standard packages for general commercial usage. The successful applicants will be able to work on his or her own initiative, and will be happy to fit into a small and friendly team.  
*Career prospects are dependent on the success of projects and resulting expansion.* **Contact: Margaret Stevens**

**Bracknell** **up to £8,000**  
A small development group has been established in Bracknell by an international engineering organisation to continue their expansion of the industrial systems market. They have immediate opportunities for mini computer programmers and specialists to work at all levels on these projects.  
Applicants must have at least two years experience in industrial or process control applications using mini computers. A sound background of FORTRAN, CORAL, RTL/2 or Assembler is essential.  
Excellent salaries, relocation expenses and the opportunity for commissioning work in various parts of the world. **Contact: Jim Baker**

**Berks** **c. £5,500**  
Our client, a well established systems house, require a FORTRAN programmer to join a team developing special systems.  
Candidates should have a minimum of two years experience of FORTRAN in a technical environment and be capable of working at all levels in a project. Knowledge of an Assembler language and mini computers would be a positive advantage.  
*Salary is negotiable according to experience. Challenging opportunity in a professional team.*  
Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant.  
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.  
**JAMES BAKER ASSOCIATES, International Personnel Consultants**  
18 Maddox Street, London W.1. Tel: 01-491 4478

**North of London** **c. £7,000**

Our client is a well-respected manufacturing organisation with a continuous and rapid growth record. This vacancy presents an excellent opportunity for an experienced communications expert to join a team working on the development of Distributed Processing Products. Ideally we are looking for technically competent individuals with a minimum of 2 years up-to-date knowledge of communications including an understanding of hardware and software developments in this area. The person appointed will be responsible for providing technical direction to the company's communications policy. The range of benefits offered is extensive and include relocation expenses and regular career assessments.

**Contact: Margaret Stevens**

## ITALY

A leading U.K. consultancy, with many projects underway throughout Europe, seeks to increase their on-site documentation staff with a major Company in Italy. The position involves understanding mini computer technology from a software point of view plus a thorough knowledge of applications. Programming ability in at least one language would be an asset. The successful candidate will be either a practising Technical Author or a Programmer with writing skills who would enjoy this aspect of d.p. work. A knowledge of Italian would be an extra bonus.

**Long-term possibilities, enjoyable locale. Contact: Mike Creamer**

## AUSTRALIA

Computer professionals with more than 3 years experience who are determined to emigrate to Australia will benefit from our consultancy service. Initially, we advise and provide an assessment of your career prospects in Australia and, later, when your arrival there is imminent, you receive the concentrated services of our Associate company in setting up introductions to suitable vacancy positions in Australia. Since JBA commenced this service we have been extremely successful, arranging a selection of possibilities for people arriving there (mainly in Sydney and Melbourne) and the people concerned thereby found ideal employment very quickly.

**Contact: Mike Cremer**





## LOTHIAN REGIONAL COUNCIL

Computer Systems Development  
ICL 2900 series

### Edinburgh

Lothian is the second largest regional authority in Scotland and provides a diverse range of services to a population of 755,000. The Computer Centre is located in Edinburgh, a city rich in cultural and recreational facilities.

To meet the expanding demand for computer services the current I.C.L. System 4 computers are shortly to be replaced by an I.C.L. 2970/2960 configuration. There is a need to strengthen and expand the project development teams by the appointment of a number of Senior Systems Analysts and Systems Analysts/Programmers with varying backgrounds and levels of experience.

#### Senior Systems Analysts £4477-£5819

Candidates should have sound qualifications, a programming background and at least 3 years' relevant experience in system analysis. They must have demonstrated ability to accept responsibility for a major development project.

There are a wide range of applications included in the current work programme, involving both batch and T.P. systems covering the Financial, Technical and Administrative functions of the authority.

#### Analyst/Programmers £3957-£4915

Candidates should have considerable programming experience with at least 1 year's involvement in systems work. Although not essential System 4 or 2900 experience would be an advantage. The main language is COBOL but there are applications where USERCODE and FORTRAN are used.

Successful applicants will contribute both at a systems and programming level to the development of computer projects.

Starting salaries will depend on individual qualifications and experience. The above salary ranges are inclusive of current supplements and will be the subject of a national pay review effective from July 1978. Assistance may be provided with relocation, where appropriate.

Please write or phone for an application form from:

The Development Manager  
Lothian Regional Council  
Computer Centre  
Warriston's Close (323 High Street)  
Edinburgh

Tel: 031-229 9282  
Ext. 2321

## Software Systems



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**How long**  
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transaction processors  
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Please write to Kathleen Scott, Personnel Officer,  
Systems Engineering Group

Logica Limited  
64 Newmarket Street, London W1A 4SE  
or telephone 01-831 9711 for an application form quoting ref. SE/6

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- Merchandise control through 600 POS terminals
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#### SYSTEMS ANALYSTS Around £5,000

You should have 1-2 years experience. It will be an advantage if you are familiar with retailing. Starting salary will depend on your experience, but should be around £5,000. Contact Tony Russell or John Shakespeare (extension 140).

#### PROGRAMMERS & SENIOR PROGRAMMERS c.£4,000/£4,500

At least 18 months COBOL experience is needed. If you have more (at least 3 years) and the ability to supervise a small team, you will be interested in the senior job. Salaries again depend on experience, but will be around £4,000 and £4,500 respectively. Contact Barrie Walker (extension 77).

#### OPERATORS & SENIOR OPERATORS Around £3,500/£4,000

Again, 18 months' experience (3 years for senior operators) including job set-up and file control. Applicants must be prepared to work shifts. Your initial income will be around £3,500/£4,000 respectively p.a. inclusive of all appropriate allowances. Contact Malcolm Rebetore (extension 118).

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A BURMAH GROUP COMPANY

#### UNIVERSITY OF EDINBURGH RESEARCH ASSOCIATE PROGRAMMER

Required by the UNIVERSITY OF EDINBURGH RESEARCH UNIT. Applicants should possess experience in IMP (Interpreted Macro Programming) or ALGOL. The work will involve the preparation and testing of computer programs using both standard techniques and special purpose programs. Salary will be in the range £3,100 - £4,500 per annum.

For further information, please contact: The Secretary, FORTH, High Street, Edinburgh EH1 1HT. Tel: 071 552 5111. Please quote reference No. 1.

#### CONTRACT PROGRAMMERS IMMEDIATE CONTRACTS LONDON & SURREY

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#### CAPITAL APPLS FORTRAN PROGRAMMERS

Highly motivated individuals with 2-5 years' experience in FORTRAN programming. Salary £3,000-£4,000 p.a. All areas. For further information, please contact: CAPITAL APPLS, 14/15 Gresham Street, London, E.C.2

#### ALM need a

#### SENIOR COBOL PROGRAMMER

We handle lead! If you can handle GEORGE 3 have 2 years' COBOL experience can take control of our programs want £4,500 Then telephone 01-606 4400 x 281 or write for an application form to:

Mr. H. V. Hall  
The Data Processing Manager  
ASSOCIATED LEAD MANUFACTURERS LIMITED  
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**Support  
Programmers  
to £6,500  
plus £600 allowances**

**New powerful IBM installation. COBOL and PL1 support team being established**

To the uninitiated, the attractions of support programming are not always apparent. Some of these attractions are:-

- ★ Concentrated experience
- ★ Business involvement

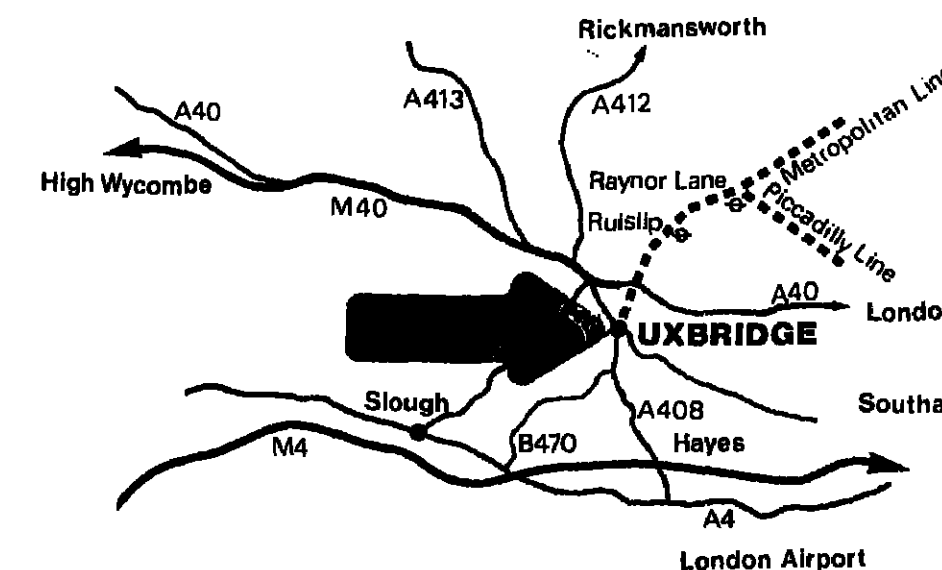
The client is a major force in the food, entertainment and leisure industries, with sales exceeding £1,600 m. per annum. Data processing for the Group is provided by a large internal bureau being equipped with powerful IBM hardware. The bureau provides development, production and support functions to group companies.

The Central Support Team carries out

- immediate repairs to systems that fail
- optimisation exercises on existing systems
- systems acceptance trials

The team provides round the clock coverage, which requires each team member to be on standby at certain times each month. For this an allowance of £600 p.a. is paid. A radio paging system operates up to 40 miles from the Data Centre. All team members are expected, after a suitable period of familiarisation, to be able to deal with any of the bureau's systems.

A generous relocation package is offered.



- ★ Quick results
- ★ Troubleshooting Role

This provides some of the challenge of the job. Members also feel vital to the running of the business of group companies. They see the results of their work quickly and the team spirit and morale are very high.

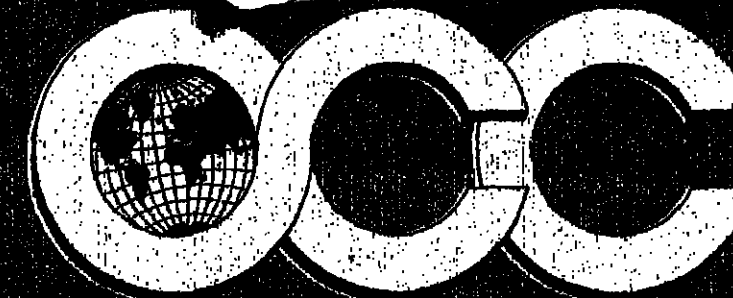
The ideal candidate would have 3-4 years' PL1 and/or COBOL experience in an OS environment. However, combinations of other experience would be acceptable e.g. PL1 in a DOS environment; COBOL alone under OS etc. GOOD and RELEVANT experience of a lower level e.g. 1 year plus, would also be considered for positions at a less senior level.

If these openings sound interesting, please ring me, Neville John, on 01-242 9356 (day) or Farnborough (Kent) 52017 (evenings and weekends), NOW to arrange a meeting or to discuss these positions further. We can arrange a meeting directly with our client at the Data Centre if this would be more convenient.

COMPREHENSIVE BACKGROUND NOTES are available to suitable candidates.



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- \* WIDEN YOUR COMPUTER KNOWLEDGE
- \* PROGRESS TO ANALYSIS AND PROJECT RESPONSIBILITY

## IBM PROGRAMMER

Our client, a sophisticated computer and technology company has openings for a number of experienced programmers. Candidates should have at least 2 years' experience on any high level language. Co. offers:

- \* Development of real time systems.
- \* Exciting and interesting work in up-to-date technology.
- \* Excellent career prospects.
- \* Subsidised lunch, pension scheme and other company benefits.
- \* Salary to £8,600.

Ref: 1802

## IBM PROGS

Our client, an American publishing company, has vacancies for COBOL programmers with at least 3 years' experience for their Amsterdam office. The company retains IBM 370 hardware and successful applicant will be involved in a variety of commercial applications. Co. offers:

- \* Excellent working conditions.
- \* Great career prospects in this progressive organisation.
- \* English speaking environment.
- \* Salary approx. 40,000 guilders (£10,000).

Ref: 1803

## ICL PROG

Major U.K. co. based in rural Northampton, with one of the largest ICL 2800 installations in the country, seeks programmer with minimum 2 years' ICL COBOL experience. Variety of new developments coming up particularly in the stock control, warehousing and accounting areas. Co. offers:

- \* New and exciting development work.
- \* Excellent career opportunities in a growing installation.
- \* Non-contributory pension.
- \* Discount on goods.
- \* Salary £4,800 + relocation expenses.

Ref: 1485

## PDP II PROGRAMMERS

Challenging and interesting career. Implementation of business applications on PDP11 using DIBOL. Some interactive processing experience preferred. In return our client offers:

- \* Training in the analyst field.
- \* Good promotional prospects.
- \* Excellent co. benefits.
- \* Salary £5,000 circa.

Ref: 3003

## JUNIOR PROG

Very rare opportunity for ambitious person wanting to work overseas. If you have initiative, good education and approx. 6 months' COBOL/PL/I or experience of other language then ring NOW!

- \* Co. offers
- \* Excellent training within world-wide organisation using modern technology.
- \* Responsibility for maintenance but will be more into development areas.
- \* Centrally based - AMSTERDAM.
- \* English speaking country.
- \* Salary 35,000 guilders (£8,750 p.a.)

Ref: 1449

## MINI PROGS

Prestige company based in America, Europe and U.K. are recruiting persons at varying levels (from programmers to systems specialists) for their new City offices. Having large DEC PDP equipment, they seek people with exp. on any MINI but using ASSEMBLER. They offer:

- \* Extensive training in up-to-date technology.
- \* Excellent career opportunities.
- \* Training in RSX, RTII and RSTS.
- \* Chance to travel abroad.
- \* Salary £6,000 - £10,000 p.a.

Ref: 1478

## PROGRAMMER

Our client is a major organisation providing comprehensive marine engineering and construction services to companies engaged in hydrocarbon development. Retaining IBM 370, under DOS/VS they seek person with 4 years' COBOL exp. with PL/I, RPG or ASSEMBLER as asset. Co. offers:

- \* Variety of projects pertaining to administration within a rapidly expanding co.
- \* Centrally based - BRUSSELS.
- \* English speaking environment.
- \* Settling in allowance for married or single persons.
- \* Salary approx. £18,000 p.a. - total package.

Ref: 1474

## ANALYST/PROG

Electronics manufacturing co working on a global scale seeks clear, logical thinking analyst programmer for their ICL 1900/2800 series equipment.

- \* Control of small development or support projects.
- \* Supervisory exp.
- \* Full scale of projects ranging from purchasing to financial modelling.
- \* Subsidised restaurant/dining club.
- \* Salary £5,500.

Ref: 1183

- \* LEARN NEW TECHNIQUES — TELEPROCESSING, DATABASE, ETC.
- \* LEARN NEW LANGUAGES, NEW COMPUTERS
- \* INCREASED EARNING POTENTIAL

## PL/I PROG

Our client a major and successful concern wishes to strengthen its European programming team. Retaining IBM 370 hardware under DOS/VS, the co. seeks ambitious person with PL/I, CICS or COBOL being an asset. Co. offers:

- \* Involvement in development of new and exciting projects.
- \* Opportunity to work with an expanding organisation operating world wide.
- \* Centrally based - Amsterdam.
- \* Salary 40,000 guilders (£10,000) cost of living allowance and relocation expenses.

Ref: 1473

## HONEYWELL ANALYST PROG

Manufacturing company producing a wide range of household goods is seeking an analyst programmer with at least 2 years COBOL experience. The successful applicant will join a professional and enthusiastic team utilising Honeywell mainframe and preferably have had GCOS experience. Co. offers:

- \* Excellent working environment.
- \* Good career prospects.
- \* Life Ass. BUPA, LVs and 4 weeks' hols.
- \* Discount on all company products.
- \* Salary to £8,000.

Ref: 1493

## SYSTEMS ANALYST

World-wide company which provides services to oil and construction industry has an immediate vacancy for systems analyst. Candidates should have at least 2 years in the design and implementation of large commercial systems. IBM programming background would be an advantage. World-wide user contact. Co. offers:

- \* Excellent career prospects.
- \* Generous fringe benefits including LV's.
- \* Pension scheme 'S.T.L.S.
- \* Salary to £7,000.

Ref: 1480

## SALESMEN/WOMEN

World-wide manufacturing company based in Amsterdam seeks salesmen/women to be involved in marketing their hardware, software and ancillary equipment. Co. offers:

- \* Tremendous career opportunities.
- \* World-wide first-class travelling.
- \* Relocation expenses for married and single persons.
- \* Salary 42,000 guilders (£10,000) + commission + expenses.

Ref: 1339

## ANALYST PROGRAMMER

Our client, an international engineering company retaining IBM 370 hardware seeks an analyst programmer with a minimum 4 years' COBOL experience. ICL/VS would be an advantage. The company is situated in a historical University town close to the Dutch-German border. Co. offers:

- \* Relocation expenses.
- \* Working in a new modern complex.
- \* Excellent career prospects.
- \* Salary around 40,000 guilders + BONUS.

Ref: 1473

## PL/I PROG

Well-established D.P. division of major international trading co. is rapidly expanding and consequently seek Senior PL/I programmer (knowledge ASSEMBLER an asset) with significant years of experience. They offer:

- \* Variety of well-planned projects.
- \* Promotion prospects with a company who knows where they're going!
- \* Training in CICS.
- \* Staff restaurant.
- \* Salary to £7,000 p.a.

Ref: 1479

## ICL PROGS

Our client is a city based financial institution retaining ICL 1900 hardware with a 2800 plan for 1979. They require persons with min 12 months ICL COBOL exp. and can offer:

- \* Exciting and interesting company and future development work.
- \* Excellent training - promotion prospects.
- \* 3% house purchase scheme.
- \* Non-contributory pension free life assurance.
- \* Salary £5,000 neg.

Ref: 1437

## PROGRAMMERS

One of the most rapidly growing forces in the computer services industry in the U.K. our client provides a comprehensive range of services to clients world-wide. Retaining IBM 370 150 under OS, 10 weeks' programmers with min 18 months' COBOL and/or PL/I. They offer:

- \* Above within programming into systems analysis or sales support or join one of their specialist groups.
- \* Chance to move on to Analysts.
- \* Excellent promotion prospects.
- \* Salary £5,500.

Ref: 1481

## Database Systems

Due to the development and redevelopment of their advanced computer systems, our client, with a successful DP services dept., wishes to boost its programming team. Currently retaining large ICL 1900 equipment running under GII, they offer excellent opportunities for persons with minimum 2 years' ICL COBOL experience to become engaged in the implementation of commercial and financial applications as senior programmers. Candidates should have PLAN experience.

This well known organisation is currently involved in the implementation and further development of IDMS database for one of their financial systems, offering persons who have reached a stalemate in their present company the opportunity to broaden their programming experience.

In addition, a competitive salary is being offered besides 6 weeks' holiday, subsidised restaurant and excellent sports and social club.

- \* Opportunity to express leadership capabilities
- \* Opportunity to progress into analysis and secure a good career path
- \* Opportunity to learn IDMS Database
- \* Opportunity to develop COBOL
- \* Development of variety of applications

- \* Close to EUSTON/KING'S X station
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Why not find out what is available in your area? This is only a small selection of posts we have available at present. If however, you don't see anything to suit your requirements please do not hesitate to telephone us. We have a wide choice of posts at all times throughout the U.K. For the above positions — please telephone 01-734 0152/3010 (24 hours) quoting the respective reference number, or write to our London office.

## CONTRACT DIVISION

### OVERSEAS

IBM COBOL  
IBM DOS PL/I 2 YR CONTRACT  
PROJECT LDR IBM DOS PL/I 2 YR CONT  
IBM SYS 3/370 COBOL  
ANALYST PROG COBOL RPG ASSEMBLER  
SYSTEMS ANALYST MUST SPEAK DUTCH  
SYSTEMS MANAGER MUST SPEAK DUTCH

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### UNITED KINGDOM

IBM DOS VS COBOL  
IBM DOS VS COBOL  
IBM MX IV PROGRAMMER  
IBM IMS DATABASE DESIGNER  
IBM PL/I DOS VS  
IBM PL/I DOS VS  
IBM PL/I OS

WILT  
HERTS  
C. LONDON  
MANCHESTER  
N. ENGLAND  
SURREY  
ESSEX  
MIDDX

£220 pw  
£240 pw  
£220 pw  
£220 pw  
£200 pw  
£200 pw  
£200+ pw  
£180 pw

IBM IMS PROGRAMMER  
IBM OS PL/I  
IBM OS COBOL  
IBM OS SYS ANALYST IMS DB/DC  
IBM OS COBOL  
ICL 1900 PLAN DRIVER  
PDP11/70 MACRO II REX II  
PDP 11/34 BASIC RST/LE + COBOL  
PDP 11 A/PROG BASIC +  
PDP 11 CONSULTANT  
PDP 8 ENGINEERING BACKGROUND  
BURROUGHS 3700 1700 COBOL  
UNIVAC 1108 EXEC + COBOL  
PDP BASIC +

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For Midlands and N. England requirements please: 061-333 8341/3 (Manchester) or 021-238 1794 ext. 223 (Birmingham). For all other contracts phone London Office, Christine Kay or Dave Haydon, 01-734 0152 (24 hours)

**KNIGHT PROGRAMMING SUPPORT LIMITED**

27 NOEL STREET, LONDON W1. TELEPHONE 01-734 0152/6 (24 HOURS)  
OFFICES AMSTERDAM, PARIS, MANCHESTER, BIRMINGHAM

## SYSTEMS ANALYSTS

To £6,500 MID ESSEX  
A major manufacturing company is involved in expansion plans within their D.P. department and requires experienced commercial analysts especially those with real-time application involvement. Although ICL equipment is used your actual machine experience is unimportant. This firm offers generous relocation expenses and 4 weeks holidays, etc.

CW20/1 Annette

## SUCCESSFUL SALESMEN

To £16K quota earnings U.K.  
We now have ten different firms for both hardware and systems only companies who are anxious to meet successful salesmen in this industry. All firms have bonus schemes and cars or car allowance. Most positions in S.E. England. Four in Midlands.

CW 20/2 Michael

## SENIOR CONSULTANTS

£6,500-£10,000 CENTRAL LONDON  
Nine large, well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require first-rate service. Technical communications consultants are also required where in-depth implementation experience of IBM or ICL T/P message switching networks, etc., are essential. Excellent fringe benefits and prospects.

CW 20/3 Michael

## FREELANCE PROGRAMMERS

To £260 p.w.  
Apply now for the latest vacancies, IBM, HONEYWELL, DEC & ICL programmers welcome. Earn a summer holiday paid break plus an attendance BONUS. Ask for the Contracts Officer on 01-995 5485.

CW 20/4 Irene

## PROGRAMMER

To £6,500 NW LONDON  
Our clients in the travel business are urgently requiring an IBM ASSEMBLER or ICL USERCODE programmer to work on Real-Time and DATABASE applications. A very good chance to take part in a major R/T installation at work. Very nice travel perks.

CW 20/5 Annette

## PROGS/SENIOR PROGRAMMER

£4,000 to £5,500 S COAST/DORSET.  
A major insurance group with the latest IBM OS. Installation is anxious to interview well qualified COBOL programmers who wish to enhance their career experience. Really excellent perks including Flexitime, Non C.P.S., 4 weeks hols. plus a lovely area to work.

CW 20/6 Annette

## MINI COMPUTER PROGRAMMERS

£4,000 to £7,250 LONDON & HOME COUNTIES  
If you have experience in ASSEMBLER or micro-code or communications for at least 1 1/2 years then a whole exciting field is open to you. We now have opportunities in SW, NW or W. London, Surrey, Berks and Hertfordshire for competent people in this rewarding field. The future is definitely going to be with the MINI-computer professional. Telephones for details.

CW 20/7 Michael

## TIME SHARING PROGRAMMERS

To £6,800 LONDON  
If you have had time sharing experience involving the use of FORTRAN, BASIC or ASSEMBLER, then we have four nationally known companies who would offer you an exciting job in pre or post sales support. Some offer generous bonus schemes.

CW 20/8 Michael

## JUNIOR PROGRAMMERS

£3,000 to £4,300 SE ENGLAND  
You have only 1 year's commercial experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you. Some offer mortgage assistance to the right candidates after short period with them.

CW20/9 Annette

## OPERATORS/SEN. OPERATORS

To £4,300 inc. MID-HAMPSHIRE  
A major commercial ICL G11 user is expanding its present large installation to the 'new-range' ICL equipment and requires additional operating staff who will get the opportunity of working on the latest computers. Their perks include relocation expenses and subsidised restaurant, etc.

CW 20/10 Patricia

## SHIFT LEADER

£4,500 inc. E LONDON  
If you are looking for career progression with very good promotional prospects then apply now. Excellent IBM OS/VS installation with company benefits like 4 weeks hols. Non C.P.S. and a subsidised canteen.

CW 20/11 Patricia

## OPERATORS/SHIFT LEADERS

To £4,000 inc. W1  
Here is a very nice job. A 2-shift system having ICL 1900 equipment using G11. Vacancies exist for 2 Operators and a Shift Leader. A nice firm involved in Consumer Products. Active S.S. Club, cheap bar and restaurant.

CW 20/12 Patricia

## SNR. OPS/OPERATORS

£4,000 to £5,500 inc. N LONDON  
A major IBM 370/OS user is offering really excellent perks including high salary and paid overtime plus paid removal expenses. You must have a minimum 1 year OS experience though.

CW 20/13 Patricia

RECRUITMENT CONSULTANTS Universal Computer Associates Ltd. Data Express House 3 Prospect Place, Heathfield Terrace, Chiswick, W4

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**Programmers, 20 plus Cobol, Cobol/Assembler, Basic**

and Development using both established packages and assisting with Original Systems Development. Equally, we are currently implementing a major package design programme ourselves across a wide commercial and industrial sector. No-one seeking a Midlands based opportunity, with UK travel if desired, will find any better alternative than the new advanced Data Centre. Get in on the ground floor today and grow your career with the company's development. Help EMS get more results and we will help your career.

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**EMS Consultants Ltd.**  
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**Fiveways, Edgbaston, Birmingham**  
**021-454 7906/7/8**

**5 1/2 K - 8K. North West**

The EMS Consulting Group has a large series of further vacancies for experienced Analysts and COBOL Programmers to work on assignments throughout the Lancs, Cheshire areas on commercial and distribution projects. Equally, longer term opportunities will be available for Senior Analysts within our Consulting Divisions to take Project Management responsibilities for the introduction of Turnkey Systems supporting a wide variety of applications requirements. We offer excellent salaries and a series of career development opportunities second to none. Relocation assistance will be paid where appropriate.

Consultant: Don Philp / John Wood.

Telephone urgently: 0782-623665. Don Philp / John Wood

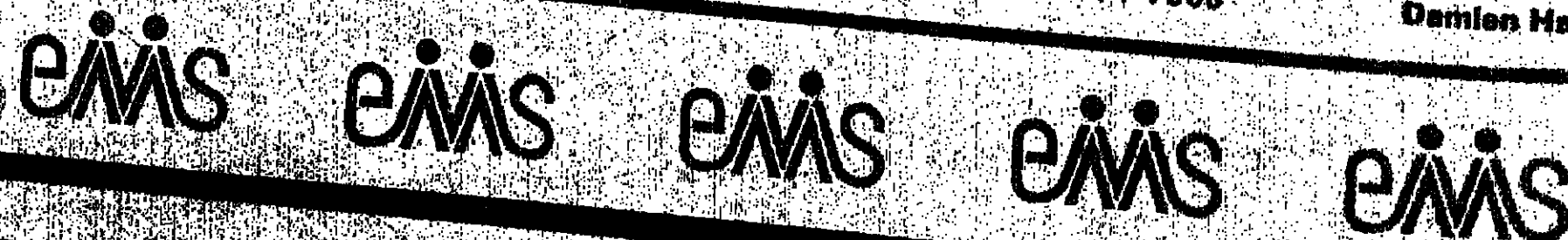
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EMS, as almost the entire Honeywell market know by now, are the leading Honeywell Consulting employers throughout the U.K. Following the outstanding success of Honeywell's marketing policies during the last 12 months, subsequent sales of equipment have resulted in demand for EMS support services hitting record levels. Subsequently, we urgently need experienced Analysts and Programmers plus IDS/TDS and GCOS staff for a wide variety of vacancies throughout England and Scotland. Equally, the successful development of our Level 6 Turnkey Systems Division has resulted in the need to employ a further 45 staff in this area alone to custom built client application systems. Irrespective of location, E.M.S. have opportunities. Equally, for staff with 2 or 3 more years' experience, relocation assistance would be paid where necessary for candidates wishing to join any of our project teams throughout varying UK locations. For a top career opportunity working on L66, 64, 62 and Level 6's, E.M.S. offers the ultimate in progress. Join the Market Leaders and see life at the top.

Consultant: Damien Handlip.

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**Damien Handlip**



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between 5.30 - 8.30 pm  
on Monday 22nd or Tuesday 23rd May

If you can't make it at those times but are still interested in meeting us, contact:

Phil Probert, Personnel Manager, UCSL,  
Station House, Harrow Road, Wembley, Middlesex  
Telephone: 01-903-1414

UNIVERSITY OF ABERDEEN

## RESEARCH STUDENTSHIPS

Applications are invited for SRC studentships, tenable from October 1978 for research in data bases, leading to Ph.D. degrees. One of the successful students will be expected to work in some aspect of PREL (a Prototype Relational System with Codd-style interface) and the other in a joint data base project with ICL at Stevenage, Herts, using an associative memory. SRC studentships may be available for both.

Any British student holding or expected to obtain at least an Upper Second Class Honours degree in Computing Science or a similar degree in another discipline plus experience in computing may apply.

Further information and application forms can be obtained from Dr S. M. Dean, Department of Computing Science, King's College University of Aberdeen, Old Aberdeen, AB9 2UB. The completed applications along with recommendations from two referees should be submitted by the end of June.

## PLYMOUTH POLYTECHNIC

Computer Centre  
**SYSTEMS PROGRAMMER**  
**I.C.L. 1903A/2903**  
**SYSTEMS**

Salary: £6,300 - £4,615.30  
(including supplements)

To be concerned with developments for the ICL 1903A/2903 installations, including user support, utilities development and testing, and programming advisory service.

Experience in George 2 and Mainframe essential and proven experience in Fortran and Basic. A working knowledge of Cobol and/or Plan will be advantageous.

Placement on salary will be consistent with experience and qualifications.

Application forms to be returned by Friday, 8th June, 1978, can be obtained with further particulars from the Personnel Officer, Plymouth Polytechnic, Drake Circus, Plymouth PL4 8AA.

## PERKIN-ELMER DATA SYSTEMS | INTERDATA DIVISION

## APPLICATIONS SOFTWARE SPECIALISTS

**SALARY TO £7,000**

The INTERDATA DIVISION of PERKIN-ELMER DATA SYSTEMS has located a significant part of its software development at its International Headquarters, based in Slough.

At present, the department is 40-strong, and combines a friendly and informal working environment with high professional standards.

Our current requirement is for suitably qualified professionals who can demonstrate significant achievement in the commercial software field. The successful candidates will form part of a new group, working in the area of development support, which covers such services as:

- ★ Validation of individual software products.
- ★ Integration of these products into complete systems.
- ★ Maximisation of system performance.
- ★ Documentation of the overall system.
- ★ Continuation software engineering.

## THE QUALITIES WE SEEK INCLUDE:

- ★ A minimum of three years' relevant experience in a commercial software product environment, either in a development situation or as a user.
- ★ Practical experience in COBOL and/or RPGII with some knowledge of Assembler.
- ★ Good communication skills.
- ★ A knowledge of database and transaction processing techniques would be an asset.

## WE OFFER:

- ★ Salaries up to £7,000 p.a. for the right applicant.
- ★ Relocation expenses where appropriate.
- ★ The usual large company benefits, including pension and health insurance.

If you are interested and would like more information call Bernard Evans, or write to him at the address below, giving your career details.

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Our client, a rapidly expanding subsidiary of a major public group, provides consultancy and bureau services to in-house and external clients with involvement in both I.B.M. and I.C.L. installations. Recent growth and re-structuring has led to the following requirements:  
**Project Leader - Systems, Senior Systems,**

J.C. Parkin, Ref: 45193/CW

Male or female candidates should telephone in confidence for a Personal History Form to:  
**MANCHESTER: 061-236 8981, Sun Life House, 3 Charlotte Street, M1 4HB.**



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**Technical Assistant, AP4**  
Up to £4,341 per annum, inclusive

This post is primarily concerned with computer programming and systems analysis. In addition a limited amount of computer operation is involved, especially in relation to new applications, and at times outside normal office hours for which overtime is normally payable.

Experience is required in COBOL and preferably also in BASIC, preferably in relation to Honeywell 51/60 equipment.

The post falls next to the Computer Officer and is responsible in his absence for all aspects of the work of the computer section.

Application forms and job details may be obtained from the

Manager of Personnel & Management Services Division, Basildon Council, Northgate House, 2 High Pavement, Basildon (Telephone 22881 Ext. 223).

Please quote reference - /F86/CW Closing Date: 31 MAY 1978.

## COMPUTER OPERATOR (DAY SHIFT ONLY)

**S. HARROW c.£3500**

We are installing a Honeywell 62/50 128k disc/tape computer in July 1978 and we require an experienced operator to join our newly formed Data Processing Department.

Applicants should have a sound knowledge of Level 62 GCOS/JCL and relevant qualifications.

The position will reflect the benefits of working within an expanding company which is part of a multi-national group involved in quarrying, asphaltting and ready-mixed concrete.

Contact: Richard White on  
(01) 864 6611 or write to the  
Operations Supervisor,  
Pioneer Concrete  
(Holdings) Ltd.,  
56-60 Northolt Road,  
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## Programmers — Analysts — Project Leaders

**To £6,200** **Oxford**  
for a team leader required to set up and organise a team of programmers starting a new project the company requires to expand and develop a new area of their business activities. Early advancements are possible for the successful applicant who has a good technical background preferably with a knowledge of PL1. Travel within the UK involved initially, with possibility of travelling in Europe as the department becomes established. The company offers a good future with relocation costs payable in the right circumstances, possibility of company car but subsidised travel and pool cars available from start. Subsidised staff restaurant, free life assurance plus many other benefits. For more details enquire now and quote reference number.

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**WE HAVE ON FILE A LARGE NUMBER OF VACANCIES FOR COBOL PROGRAMMERS WITH A MINIMUM OF 1 YRS. EXPERIENCE RANGING FROM JUNIOR TO PROJECT LEADER LEVEL. SALARIES TO £6,000 p.a.**

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for systems analyst with a minimum of 4 years' analyst experience. A knowledge of on-line systems with insurance or banking applications a definite advantage. Modern offices with easy access for commuters. Company benefits include free life assurance cover, up to 3 times annual salary plus a contributory pension scheme. Company at present considering proposal to upgrade current ICL 1902T to 2960 equipment.

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**To £6,750** **Southampton**  
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**AOC 1101**

**To £5,500** **Liverpool**  
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**AOC 1087**



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We are a computer service organisation operating in four states and specialising in E.D.P. personnel and on-line services.

We would welcome enquiries from all persons desirous of joining our own company or client organisations.

Salaries range from \$A12,000.00 to \$A20,000.00.

Expertise in Burroughs medium systems software and large IBM systems (370/158 OS/VSI or MVS)

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Applications in writing should be forwarded to the address given below together with details of estimated arrival time in Australia and resident status (permanent, working visa etc.)

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A prompt reply regarding your personal prospects of securing the right position is guaranteed. Write in confidence to:

Mr. P. Johnston,  
Halifax Management Services Pty. Ltd.



551 King Street,  
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If you are interested in daily contact with computer people - Engineers, Operators, Maintenance Staff - we may have an opening for you. £10,000.00 salary and profit sharing benefits to the right people. For more details contact: 01-499 4501 or 01-499 4502. Complete details on 01-499 4501.

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Our client is an international leader in computer communications and control systems technology with major export orders and enquiries. Real-time Software Engineers. Micro-processor Applications Engineers. South Coast up to £5,500. The company is based in an attractive £2.1m country and very generous relocation packages are given. Please contact: Dave on 01-499 4501 or 01-499 4502. Nolen on 01-534 9288 or write: Finance Executive, 50 Thurloe Place, London, SW7 2QQ. Ref No. FCL/11. (Age 25+)

Thurloe Executive

## DOS/VS SYSTEMS PROGRAMMER

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Our client is a leading name amongst foreign banks and their operations include a large London Office. This supports an IBM 370 installation which is undergoing significant developments, including On-Line systems. Running under DOS/VS, they use CICS, Power/VS and require a Systems Programmer to support the IBM software and provide technical assistance to the systems and programming staff. In addition, as a senior technical member of staff, he/she will be involved in the installation of a data base system.

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This company is a world leader in real-time process control systems. Increasing sales give rise to the following staff requirements in the Software Development Department.

**TEAM LEADER** (Interactive Languages)  
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This is a senior appointment leading a team developing interactive language compilers.

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A number of attractive vacancies exist for software designers with various levels of experience in the following areas:

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This is a first-class opportunity to exercise your skills with a growing organisation in a rapidly expanding market.

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Two experienced programmers are required to develop systems for micro computers. Both contracts are for a minimum of 2/3 months and are renewable on a monthly basis. The FORTRAN programmer will develop telecommunications applications and the DIBOL person will create package program products for subsequent marketing.

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A senior experienced DP Marketing Executive is sought to take the service to the market place and secure a viable share of the market in the short-medium term. To do this successfully, you must have demonstrable sales capability and preferably a comprehensive awareness of the 2900 range and its market place.

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RW 20/4

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We can offer you:

- 'State of the art' Software Developments in:
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  - Compilers — Data Communications
- A relaxed professional work environment on London's Green Belt, (current locations are Cockfosters and Potters Bar).

We are only looking for good software professionals, people dedicated to improving the software development process and expecting to be justly rewarded for it. We recognise potential at all levels and it might surprise you to find out just how much we value your software expertise.

We'd like to tell you more about the opportunities currently existing within IDEC, so why not come along and talk to us over a drink!

If these dates are not convenient, then telephone us on: Potters Bar 44187, or write to: Mr J. Hooley, Personnel Manager, IDEC, Canada Life House, High Street, Potters Bar, Herts.

Come along to find out how much your experience is worth. We will be at:

**The Connaught Rooms** (Debentures Stafford Suite), Great Queen Street, Holborn, W.C.2.  
on Monday, May 22nd, between 12 noon and 9.30 pm.

OR  
**The Halfway House Hotel**, (Tulip Suite), 350 Luton Road, Dunstable on Tuesday, May 23rd, between 12 noon and 9.30 pm.

OR  
**Canada Life House**, High Street, Potters Bar, Herts on Wednesday, May 24th, between 12 noon and 9.30 pm.

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Two operators with at least 18 months operating experience on ICL 1900 mainframes are required to complete the existing operations team. Three shifts are worked with 6 personnel per shift and because of the size of the installation opportunities for career progression are excellent.

For further information, including a set of data sheets describing our clients' installation, contact our CROYDON office quoting ref: CW17-8S.

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Applications are invited from students holding good Honours Degrees in Electrical Engineering or Computer Science for two SRC CASE Studentships. One vacancy, in collaboration with LIMROSE ELECTRONICS, will investigate the educational application of microprocessors. One vacancy, in collaboration with LUCAS AEROSPACE, will investigate the industrial application of microprocessors. The collaborating firms may be willing to supplement the salary in suitable circumstances. Registration for a Higher Degree is expected. Application forms are available from the Principal, Bolton Institute of Technology, Deane Road, Bolton BL3 5AB to whom completed applications should be returned by 31st May 1978.

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**ARE SEEKING A**  
**MANAGING DIRECTOR**

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Salary will be largely governed by profits, and the bonus scheme will remain in operation for at least three years so that the M.D. can make long term plans without fear of personal considerations. 12/12 bonus will give an annual rate of well over £10,000 but the reason for recruiting such a person is to ensure even better results.

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To help us — and you — they're ready to negotiate to £8k, and higher in exceptional cases.

And to pay very generous relocation expenses.

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And, if that background should include Intel 8086, you're probably certain of top which.

A degree is desirable, anyway. So appropriately qualified graduates with little or no experience may get in at from £4k up.

Language: Mini or Micro Assembler.

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To apply, simply dial 01-836 9719 or 9882 and ask for Boris McLaren.

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**Senior Programmer**

to £5,500, plus excellent fringe benefits

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The Provident Life Association is a medium size Life Assurance Company in the City. Expansion of the Development Section has created the following vacancies in a Company committed to computerisation and about to embark upon its first venture into on-line systems.

**Senior Programmer**

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Between 18 months and three years of 1900 COBOL

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This position offers the opportunity to gain:

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TSI International, the UK subsidiary of Turnkey Systems Inc, have recently announced extensions to their product range in the form of KEY/MASTER, their successful data-entry package, now available under CICS, and are diversifying further in the areas of on-line data manipulation and retrieval. Comprehensive training in these products will be given. Company benefits are first-class, including profit-sharing, free life assurance and BUPA membership, car allowance and compensation for work away from home.

To apply for this position, or for further information please contact Sharon Matthews on 01-242 9356, (day) or Billie Gray (02774) 22357 (evenings) quoting Reference 434/CW

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These are opportunities for you to join a major U.K. Group who are leaders in the leisure industry and who are now engaged in the development of a variety of commercial and financial systems for the Group, to be based upon IBM Mainframe Hardware.

We require to identify candidates who can portray experience in the following areas and who are dedicated towards progressing their careers in what can be described as a highly dynamic and exciting environment.

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You must be an experienced computer professional with a good understanding of the concepts and applications of word processing equipment, and detailed knowledge of the software of at least one system.

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You should have a strong commercial data processing background with practical knowledge of an operational database installation. You must have a broad understanding of both CODASYL and non CODASYL structures. Knowledge of IMS, librarian, TOTAL and ADABAS would also be useful.

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If you have a good programming background on any common minicomputer, particularly DEC, Hewlett-Packard or Honeywell, and want to work in Italy, please contact us. Knowledge of Italian will of course be advantageous.

The total salary package will be very attractive to people at the moment working in the United Kingdom.

Interviews will be held in London for appointments from August 1978.

Please write, initially to:  
J. A. Taylor, Resources Manager,  
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We wish to identify two outstanding candidates able to demonstrate their ability to work with a major mainframe U.K. Sales Force in providing them with a professional Sales Support facility.

In order to qualify for one of these opportunities you will be expected to portray the following level of experience:

1. Good all round business systems experience derived from working with user management in the solution of business problems.
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3. You must be personable and able to communicate with all levels of user management.
4. Your experience will ideally include a programming background having progressed through to Systems Analysis and on to a Project Leadership role.

THESE ARE OUTSTANDING OPPORTUNITIES AND WE THEREFORE SUGGEST THAT YOU COMMUNICATE WITH US IMMEDIATELY BY TELEPHONE OR IN WRITING IN ORDER FOR US TO ARRANGE FOR YOU TO ATTEND IMMEDIATE INTERVIEWS

There's been a lot of interest in science fiction lately but, we think professional men and women like you will be even more interested in the present facts working towards the future.

Segas with one of the most advanced computer set-ups in the country serving 1.5 million customers have 50 development projects of various sizes in hand, and are still expanding to meet the developing needs of the British Gas Industry. These projects include major new systems in the supplies, customer accounting, sales and engineering sectors.

A 1MB 370 145 and a 2MB 370 148 are currently installed, running a wide range of teleprocessing and batch applications under OS/VS1, VM, CICS and VTAM. A 4MB 3032 is on order for delivery this summer to cater for the planned systems growth.

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up to £7700 p.a.

A minimum of five years' experience coupled with the ability to develop first-class working relationships with functional departments are basic requirements.

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**SYSTEMS ANALYSTS**  
up to £4600 p.a.

With a minimum of one year or more experience in a commercial systems environment.

Apart from the obvious work-scope, exceptional promotion prospects and competitive salaries... you can also look forward to generous holidays, flexi hours, sickness pension insurance schemes, comprehensive sports/social facilities, excellent working conditions and, if necessary, full comprehensive training. Those are the facts. If you are interested please call Ray Broughton on 01-688 4466 ext 6002 or after 7 p.m. on 01-657 7829. Alternatively write to: Personnel Manager, Segas, Segas House, Katharine Street, Croydon, CR9 1JU.

**SEGAS**











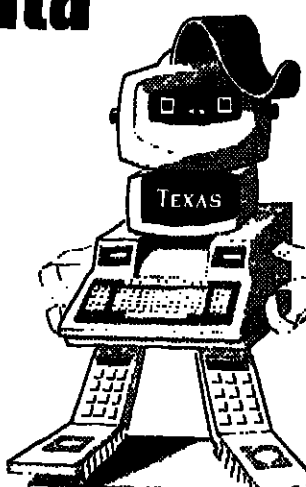
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**BASED SLOUGH AND BEDFORD** base salary c£6500 on quota earnings c£10,000 + 2 litre car + profit sharing to sell computer systems in the £5000-£250,000 range. You will be managing existing accounts and developing new business in this rapidly changing market place. Our range includes many state of the art products for a wide variety of applications. Excellent technical support is available. You must have related sales, marketing or applications experience - the ideal would be a professional salesman with a proven track record in mini-computer sales. Ref. No. FY307/1.



1  
2  
3  
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Candidates for these positions, men or women, ideally aged 25 to 40, should be educated to HNC or degree level. Ideally, you should live within a 50 mile radius of Slough or Bedford.

Excellent conditions of employment include profit sharing, free private hospital plan and generous assistance with relocation expenses, where appropriate. Please write or telephone for an application form to Ann Stevens, Personnel Department, Texas Instruments Limited, Manton Lane, Bedford. Tel: Bedford 6/466 Ext. 3442

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**Informatics Inc**

110-111 Strand,  
London WC2R 0BX  
01-2403796

### Ministry of Defence

## ADP SYSTEMS ANALYST

Dorset

This post is at the School of Signals, Blandford, Dorset. The successful candidate will work on computer aided assignment of radio frequencies. This will involve analysing frequencies to army units in the field, as well as continuous updating and improvement of the system and development of new systems for frequency assignment and electronic-netic compatibility analysis.

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Appointment will be as a Higher Scientific Officer (E3740-E4975; under review) Starting salary according to age, qualifications and experience. Non-contributory pension scheme.

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## SENIOR OPERATOR (to commence August 1978)

Candidates for the post of programmer should be of A level standard of education and have had ideally around five years previous experience of programming in COBOL.

Candidates for both posts must have some knowledge of minicomputers in general and of the ICL 2903 range in particular. They would ideally be aged 23-29. Some knowledge of international banking practice and of the French language would be an added advantage.

Salaries will be commensurate with the high standards and qualifications expected from suitable applicants, who should send brief details of their professional background, together with an indication of present and expected salary, in writing to:

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Wir bieten den kompletten Rechenzentrum-Service zentral in Frankfurt für alle europäischen Zweige einer weltweit aktiven Versicherungsgruppe. Da die Nachfrage nach unseren Dienstleistungen beständig wächst, haben wir unsere Hardware jetzt auf eine /370-138 mit 512 KB (unter DOS/VS Ref. 34) ausgebaut. Aufgrund unserer Expansion wird ein

## ANALYST/ PROGRAMMIERER

— mit guten Englisch-Kenntnissen —

mit der Fähigkeit, Projekt-Letter zu werden, gesucht. Die Aufgabe besteht in Systemanalyse in allen Versicherungsbereichen für Neuorganisation, Änderung und Übernahme fertiger Abläufe für weitere Länder Europas, aber auch teilweise Programmierung (ANS/COBOL) dafür.

Sie haben sich schon einige Jahre in Systemanalyse und Programmierung im kommerziellen Bereich bewährt, sprechen gut Englisch und kennen sich vielleicht sogar schon etwas im Versicherungswesen aus. Sie erwarten gute Entwicklungsmöglichkeiten in einem kleinen Kreis junger und engagierter Kollegen, ein sicheres und ständig wachsendes Aufgabengebiet und selbstverständlich ein sehr gutes Gehalt.

Wenn Sie sich angesprochen fühlen, senden Sie bitte Ihre ausgefüllten Unterlagen an die COMPUTER SERVICES EUROPA GMBH, 21 Westendstrasse, 6000 Frankfurt/M., West-Germany. Tel.: 0611/74 04 04. Ihre Bewerbung wird von uns absolut vertraulich behandelt.

## PERMANENT ESSEX

System Engineers  
Analysts  
Programmers

£NEG

Our client is heavily committed to developing communications systems involving various mini computers in network linkages or as stand alone devices. This is an ideal opportunity for 'go-ahead' professionals who want to acquire the right experience today, for the systems of tomorrow.

Systems Analysts

to £61K

If you have a good commercial background in Analysts and like working in a dynamic atmosphere, within a Real-Time environment, then our Client would be very interested in talking to you about current development plans and future prospects. With good transport connections, our Client is ideally located for Analysts who want to trim travel time and cost.

Programmers

to £51K

ICL Cobol is all you need to secure a good job with a progressive company in West Essex. Numerous benefits are offered. With pleasant offices and colleagues who are easy to work with, these positions are a must for any ICL Programmer living locally.

Analyst Programmers

c£61K

An IBM Cobol and/or Assembler background is required by our Client in North Essex in order that they may be assisted in major On-line, Real-Time developments now getting underway. Numerous large Company benefits are offered including flexible, generous holiday entitlements and paid overtime. Get in touch now for an immediate assessment of your chances.

Systems Analysts

to £61K

Programmers

Standards Officer

If you have drive and ability and are looking for an employer who can give you very interesting work centred around large IBM 370 machines, in a fast expanding environment, contact us immediately. Our client offers excellent promotional prospects for anyone who knows where he/she wants to go in DP.

For these and many more opportunities, please contact John McLean now on:  
**BRENTWOOD (0277) 212021**

Alternatively, send your C.V. to LINSOTT COMPUTER SYSTEMS LTD., P.O. BOX 74, BRENTWOOD, ESSEX CM15 0BZ.

**LINSOTT**  
Computer Systems Limited

## SYSTEMS ANALYSTS AND PROGRAMMERS

An I.C.L. 2960 was installed in January at Thorn Data Processing, Telford.

The site operates as a Bureau providing Batch and On-line systems through a communications and terminal network to customers in various parts of the country.

We require:

## SYSTEMS ANALYSTS c £5000

Due to expansion and internal promotion, a number of vacancies exist at various levels. Analysts work within small teams developing a wide range of systems for user companies. The ability to communicate at all levels is considered as important as a good business system and technical background.

## COBOL PROGRAMMERS c £4000

Programmers with at least six months' experience, interested in both 2960 development and conversion programming. Any hardware background considered.

Telford is situated in rural Shropshire within easy reach of the beautiful Severn Valley, low cost housing is available for rent or purchase.

For a confidential career discussion telephone the Recruitment Officer, TELFORD (0952) 583044 or write to

Thorn Data Processing  
Haldane  
Halesfield 10,  
Telford, Salop

THORN

## SHROPSHIRE

WANTED

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SALES POSITION

For pre-employment young man aged 25 with professional and technical background. 5 years' experience in approach, 5 years' experience in public service in commercial and public service systems. Free time on block to effect training/assessment.

Box 1986  
Computer Weekly

DEPARTMENT OF CLINICAL CHEMISTRY  
WOLFSON RESEARCH LABORATORIES  
QUEEN ELIZABETH MEDICAL CENTRE, BIRMINGHAM  
**SCIENTIFIC PROGRAMMER**

A Scientific Programmer is required to join a small team of computer scientists responsible for studies and research computing within the laboratory. Hardware, software and systems programming experience is required. The successful candidate will be responsible for the design, development and testing of programs for the laboratory's IBM 370/158 computer system. A degree in Computer Science or a related discipline is essential. Some experience of Fortran programming and interest in operating systems and file management is desirable. Starting salary for graduates will be £3148 per annum rising to a maximum of £3832 per annum. For local students in F2E24 rising to £2611.

Application forms and further information available from the Personnel Officer, Queen Elizabeth Hospital, Edgbaston, Birmingham B15 2TH 021 472 1311. The closing date for applications is 22nd May.

## CONTRACTS U.K. & OVERSEAS

LONDON

Systems Analyst with TP and/or DB experience  
IBM - Cobol - OS DL1 and/or IMS  
IBM - PL1 - DOS or OS  
H66 - Cobol - IDS  
ICL - Plan Driver

SUSSEX and ESSEX

Mini Assembler - Real Time operating systems

PARIS

IBM Assembler or Cobol (French speaking)  
Any Mini Assembler (French speaking)  
Cobol Compiler - Report Writer

IRAN

Univac 1100 - Exec 8 - IDMS

BELGIUM

DG Nova Cobol

**BRENTWOOD (0277) 212021**

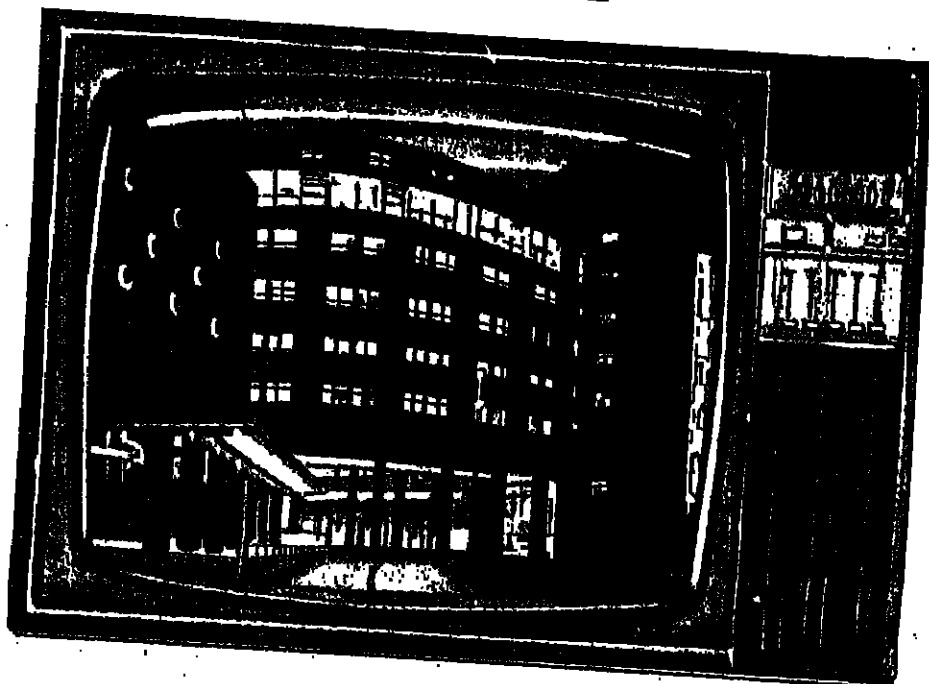
For these U.K. assignments please contact Stephen Long.

For these overseas assignments please contact John McLean.



# SYSTEMS ANALYSTS & PROGRAMMERS

## Come to an Open Evening at Television Centre on Wednesday, 24th May, at 6.30pm.



The BBC would like to invite business orientated Systems Analysts, and also Programmers, to an Open Evening on Wednesday, 24th May at 6.30pm. Meet us at Television Centre, Wood Lane, Shepherd's Bush (opposite White City Central Line Station). The purpose of the visit is to explain the role of computers in Broadcasting today, and includes a brief tour of Television Centre. Our application areas include aids to Production and Transmission Planning, Management Information

Systems, and Financial and Stock Control Systems. We think you'll find the visit extremely interesting, particularly if you're a Systems Analyst concerned about solving user problems, with 3/5 years experience; or a Programmer with 2/3 years experience with ICL equipment and writing COBOL programs in a business environment. However, if you can't come along, write or telephone, Appointments Dept, BBC, London W1A 1AA, quoting reference no 78.G:1307CW. Tel: 01-580 4468 Ext: 4619.

# BBC

## EAST STAFFORDSHIRE DISTRICT COUNCIL TREASURER'S DEPARTMENT SYSTEMS ANALYST

Grade AP 4/5/60.1 - £3881-£5085 (including supplements)  
Applications are invited from experienced systems analysts for this post which ranks second in the Computer Section. The incumbent will be responsible for the day-to-day running of the computer department, both local and remote. Experience in the implementation of communication systems would be an advantage. Salary will be negotiable within the above range, and appropriate for a suitably qualified candidate. Removal, relocation and relocation allowances will be payable in accordance with the Council's policy. Applications giving details of age, qualifications and experience should be sent to the Personnel and Establishment Officer, East Staffordshire District Council, Town Hall, Burton upon Trent, Staffs. DE14 2EB, to arrive not later than 5.15.1978. For a full reference T 310.

## Contract employment in Europe (Belgium, Holland & W. Germany)

Our client wishes to employ the following staff on a renewable six-month contract basis:

### I.M.S. Programmers

### Honeywell Bull Programmers

### Burroughs Programmers

Our client is prepared to pay 38 D. Marks per hour (around £9) and travelling to and from contract. Knowledge of a European language, though not a requirement, would be an advantage. Please apply to: Terence F. Crouch, 18 Chase Chambers, St. Helier, Jersey, Channel Isles.

RUSSELL LIMEBURN ASSOCIATES  
Executive Selection Division  
2 Broad Street Place, London EC2M 7EP

## LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE (University of London) Keppel Street, WC1E 7HT

### COMPUTER PROGRAMMER

An experienced programmer is required to work in the Department of Medical Statistics on epidemiological surveys of Parasites and Disease and other health problems. Inclusive salary in the range £3027-£4381, depending on experience. Applications, giving full career details and naming two referees, should be sent to Secretary (A1) at the School.

### CONTRACT PROGRAMMER

RPG-II, N. LONDON TOP RATES  
X-Caliber Computer Services  
47 Essex Street, WC2E 7EX  
01-385 8201

## data scene

### OPERATIONS IBM & ICL

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SUPPORT DAYS					
IBM	OS	SNR OPS	18 mths	C. LONDON	£4700
IBM	DOS	OPERATOR	1 yr.	C. LONDON	£4000
IBM	DOS	OPERATOR	1 yr.	S. LONDON	£3900
ICL	GII	OPERATOR	1 yr. +	CITY	£3800
ICL	GII	SNR OPS	2 yr. +	ESSEX	£4400
ICL	2900	OPERATOR	1 yr.	VARIOUS	£3700
ICL	GII	OPERATOR	1 yr.	W. LONDON	£3900

### VARIOUS

HONEYWELL GCOS	OPERATOR	1 yr.	C. LONDON	£3800
UNIVAC EXEC 8	OPERATOR	1 yr. +	C. LONDON	£4000
UNIVAC OS3	OPERATOR	6 mths.	MIDD.	£3700
BURROUGHS MCP	OPERATOR	1 yr.	VARIOUS	£4000
NGR B1/B3	OPERATOR	1 yr.	C. LONDON	£3800
PDP ANY	SNR OPS	18 mths.	C. LONDON	£4000

Datascene Recruitment Limited  
Sage House  
177 Regent Street  
London W1A 7PS  
01-439 7871  
24 hour answer phone

## ELLSMERE PORT AND NESTON BOROUGH COUNCIL BOROUGH TREASURER'S DEPARTMENT

### COMPUTER SECTION SENIOR OPERATOR

Grade: T.1/2 - £1500-£3323 (inclusive of supplements)  
(Bars at £2413 and £2635) + 12 1/2% shift allowance

A vacancy exists for an experienced and competent person to join the development section. The post holder will be responsible for the running of the ICL 1901T computer system and the ICL 1901T computer system. The post holder will be responsible for the running of the ICL 1901T computer system and the ICL 1901T computer system. The post holder will be responsible for the running of the ICL 1901T computer system and the ICL 1901T computer system.

Proficiency with ICL equipment is essential. The post holder will be responsible for the running of the ICL 1901T computer system and the ICL 1901T computer system. The post holder will be responsible for the running of the ICL 1901T computer system and the ICL 1901T computer system. The post holder will be responsible for the running of the ICL 1901T computer system and the ICL 1901T computer system.

A two shift system is operated, covering 24 hours per fortnight on a four day week pattern (2 days on, 2 days off).

Application forms and job descriptions are obtainable from: B. A. Lucking, Management Services Officer, Whitley Hall, Ellsmere Port, South Wirral L68 6QY. Tel: 051-355 3665 ext. 60.  
Closing date: 8 June, 1978  
Conversing enquiries

## Computer Librarian

LONDON SE 1

A Computer Librarian is required to maintain records of computer files and to prepare work for running on an ICL 1901T computer using GEORGE 3. Previous experience in computing work, especially data control or job assembly, would be an advantage but training will be given. Applicants must have C level in Mathematics or equivalent.

Salary within a scale rising from £3880 to £4305 per annum plus a self financing productivity payment of £14.53 to £17.84 per month.

Applications quoting Vacancy Number 119778/CW giving full details should be forwarded to the Personnel Officer (Recruitment), Central Electricity Generating Board, Bankside House, Sumner Street, London SE1 to arrive by 1 June 1978.

South Eastern Region

### MIDDLESEX/BERKS

Applications are invited from experienced systems analysts for this post which ranks second in the Computer Section. The incumbent will be responsible for the day-to-day running of the computer department, both local and remote. Experience in the implementation of communication systems would be an advantage. Salary will be negotiable within the above range, and appropriate for a suitably qualified candidate. Removal, relocation and relocation allowances will be payable in accordance with the Council's policy. Applications giving details of age, qualifications and experience should be sent to the Personnel and Establishment Officer, East Staffordshire District Council, Town Hall, Burton upon Trent, Staffs. DE14 2EB, to arrive not later than 5.15.1978. For a full reference T 310.

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Superdrug have rapidly expanded from 1 shop, employing 3 people to 75 shops, employing over 1,100 people, and has a continuing growth pattern. Our Computer Department is also growing to cope with this expansion. We now need a No. 2 for our Department. This person should be young and have RPGII experience. The department itself is still quite small so there is complete involvement with the work on our System 3/10 and plenty to prepare for our System/34 which is on order. The salary will be around £5,000 per annum.

Please contact:  
Mr. Howard  
SUPERDRUG STORES LIMITED  
Felnex Trading Estate  
190 London Road  
Wallington, Surrey, SM6 7EG  
Tel: 01-669 2151

## MICRO COMPUTER PROGRAMMERS

to £6,500

N.W.-S.W. LONDON

Whether you have micro experience or not - if you have drive plus experience with an Assembler - we need you.

TIPS-TERMINAL Software scheme is a small expanding company with a profit sharing that will make all employees grow with the company.

We specialise in the development of advertised text pressing and control systems for the press, printing and broadcasting industry based on ZILOG and 'Intel' micro computer systems.

To discuss vacancies that exist in our N.W. and S.W. London office ring P. Goulson - E. Jacobs - 01-328 7251.

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In line with current expansion plans we will be pleased to hear from programmers, analysts and consultants of professional disposition with a solid background on any of the following disciplines:

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COBOL  
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Forthcoming internal projects include developments on in-house equipment. Current external projects are both U.K. wide and overseas-based. Top contract fees offered.

Please telephone or send career details to:  
MARGARET DRIBCOLL, TANGENT COMPUTER SERVICES  
BROOK HOUSE, 4 EASTERN ROAD  
ROMFORD, ESSEX RM1 3PJ  
TEL. ROMFORD 0708 44181-2

Tangent  
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DO YOU WISH  
TO COMMUNICATE?

## COBOL PROGRAMMERS

£4250 p.a.

A leading company in the service industry is offering to Programmers with minimum of eighteen months' COBOL experience the opportunity to join a busy development team of four in their communications centre based in Manchester.

In addition to the normal commercial applications, plans are in hand for the development of additional on-line facilities to all branches in the U.K. expanding the stock control, administration and communication systems. All the conditions favour rapid career development within the organisation.

The hardware utilised at present is ICL 2904 although this will not rule out applicants with experience gained on other manufacturers' equipment.

Excellent conditions of employment include 4 weeks' holiday plus statutory days, subsidised staff restaurant, free parking and generous assistance with relocation if necessary... Interested?

THEN TALK TO US ON 061-832 5856 or write enclosing detailed c.v. to ATA Computer Recruitment, Anglia House, 86 Cross Street, Manchester 2 4LA.

## ATA COMPUTER RECRUITMENT

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## Computer Opportunities

Our client, based in Lytham St. Anne's, operates in the Leisure Industry, and is a subsidiary of a British group with a wide range of interests. The company recently upgraded its installation to a Honeywell 64/20, and now wishes to recruit the following personnel:

### Analyst Programmer

West Lancs to £5,250

Part of a small Data Processing department and reporting directly to the Data Processing Manager, the Analyst/Programmer will be primarily concerned with systems design and development, and programming, using COBOL under Honeywell Operating System GCOS. Probably in their mid-20's, candidates should have a background in programming with recent experience in systems analysis and design.

Ref: 24107/CW

### Programmer

West Lancs to £4,000

Applicants should be fully trained programmers, in order to provide further programming support for the Analyst/Programmer, with whom with at least one year's practical experience using COBOL. The position has been created the successful candidate will work.

Ref: 24104/CW

C. G. Moore

These positions are open to male or female applicants. Please telephone in confidence for a Personal History Form quoting appropriate reference to: MANCHESTER: 061-236 8981, Sun Life House, 3 Charlotte Street, M1 4HB.

## Hoggett Bowers Executive Selection Consultants

## PROGRAMMER

REQUIRED FOR N.C.R. CENTURY  
INSTALLATION

A programmer is required with at least 12 months' experience of Commercial Applications. Previous knowledge of COBOL or NEAT 3 is desirable though not essential. The successful applicant will have a responsible role in a recently established and expanding Data Processing department. Write giving details of qualifications, career and salary to Mr. R. E. Cowell, Lennons Group Ltd., Corporation Street, St. Helens, Merseyside.

## West Yorkshire Metropolitan County Council North Eastern Road Construction Unit COMPUTER OPERATIONS OFFICER POST REF. AZ 17003

APB/SOI £3225-£4545 plus up to a maximum of £820 supplements. The Unit is responsible for the planning and construction of major new highways in the North East of England. Well equipped offices near to Harrogate town centre. Responsible for day-to-day management of all computing operations, including technical programs connected with the traffic and economic analysis of road schemes, together with Scheme management and resourcing programs of a more general nature. Consideration is currently being given to the Unit's future hardware which could include a mini-computer. Degree or equivalent and at least three years' experience in a computing environment together with familiarity with both high and low level programming techniques and systems analysis. Application forms may be obtained from Directorate of Planning, Engineering and Transportation Room 238 County Hall, Wakefield and should be returned by 6 June, 1978.







# Systems Engineering

The Sperry Univac International Division Customer Support Centre (ICSC), is located at 141, Westbourne Terrace, London, W2 for the purpose of providing computer resources to Division Headquarters and International subsidiary users.

Top level expertise in software, hardware and operations support is provided with direct channels of communication to the development centres located in the United States.

ICSC now has a requirement for a Systems Engineering Consultant who will be responsible for the computer facility subcontract selection and supervision, site planning, and financial planning.

The successful candidate will probably have 5-7 years experience with a computer manufacturer and presently be employed as a senior engineer consultant or service manager. Sperry Univac, as a major manufacturer of computer equipment can offer excellent opportunities. Salaries and benefits are extremely attractive in keeping with UNIVAC's position as a market leader in the computer industry.

Please telephone 01-965 0511 (ext 3040 or 3043) or write with brief career details to Mrs Katherine Hartnell, Personnel Manager, Sperry Univac International Division Headquarters, Sperry Univac Centre, London, NW10 8LS.

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If you're really good at problem solving and want to gain more experience in a company known worldwide for its innovations in modern systems then Westinghouse is the company for you.

Write today to: R.A. Murley, Company Personnel Officer, Westinghouse Brake and Signal Co. Ltd., FREEPOST, Chippenham, Wilts.

**WESTINGHOUSE**  
Brake and Signal Co Ltd Chippenham Wilts

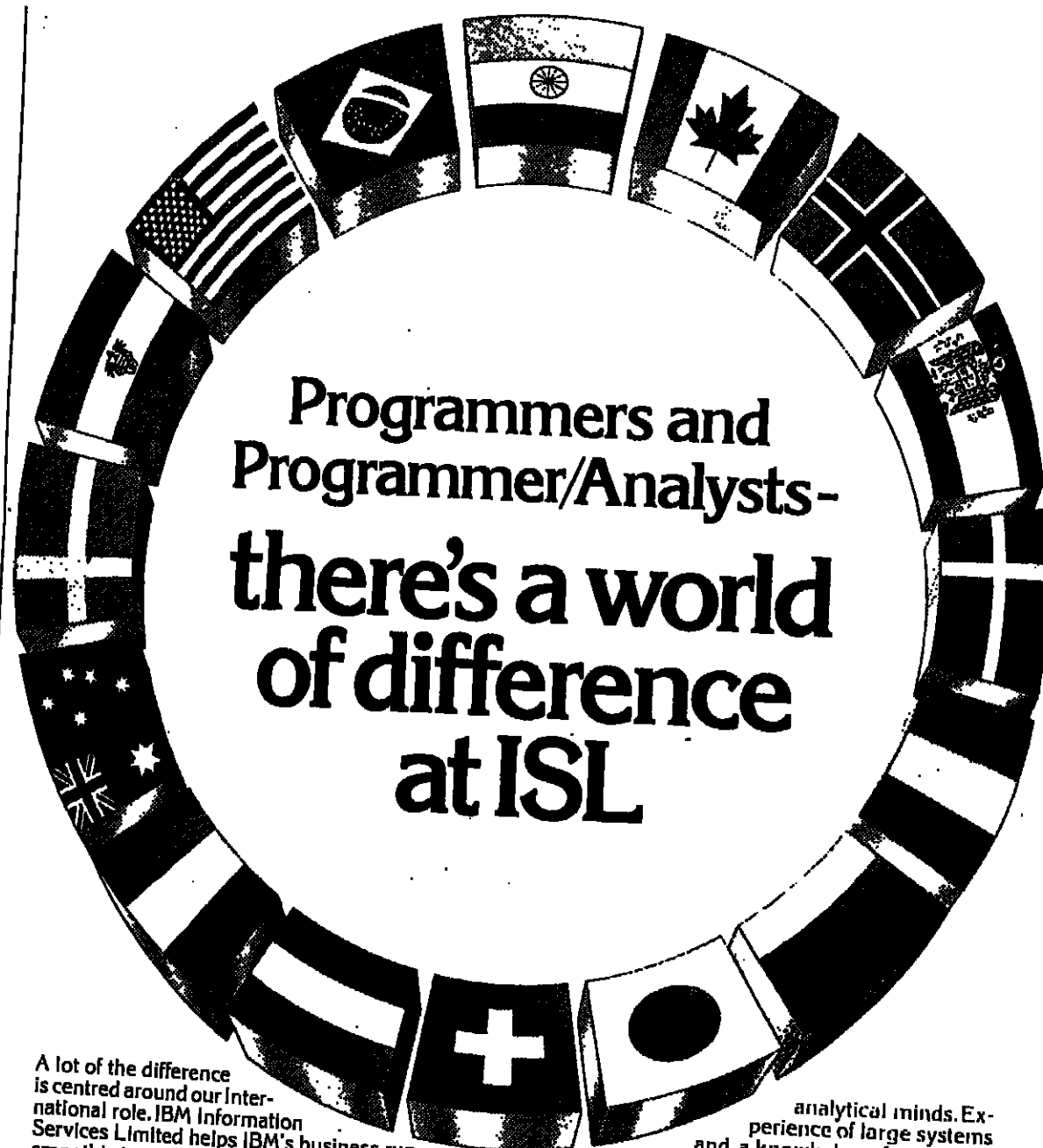
Advanced Technology in Chippenham, Wokingham & Bracknell.

## Programmers

Bristol from £3985-£4,930

- Would you like to work:
  - in a modern office at Badminton Down, Bristol
  - on an ICL 1903T/2960 DME
  - using GEORGE 3 and MOP
  - on new on-line systems
- If you have either: one years experience of COBOL and/or a degree or equivalent qualification
- Either phone Bristol 32281 Ext. 18 or write to the Personnel Manager, 15-23 Oakfield Grove, Clifton, Bristol BS8 2AS and ask for an application form AF/1. This should be completed quoting Vacancy Number 354/78/CW and returned by not later than 26 May 1978.

**Central Electricity Generating Board**  
South Western Region  
Oakfield Grove, Clifton  
Bristol BS8 2AS



A lot of the difference is centred around our international role. IBM Information Services Limited helps IBM's business run smoothly in over 20 countries, backed by one of the largest and most advanced DP installations in Europe.

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Right now, we're looking for determined men and women with 2-3 years' programming experience, a proven interest in applications, and

analytical minds. Experience of large systems and a knowledge of one high-level language would be very useful—but is not essential as both are covered in our training.

We offer generous relocation expenses to our new headquarters in this attractive part of the South Coast, which has outstanding recreational and social facilities.

Salaries are very competitive and IBM's employee benefits package is acknowledged to be one of the best in industry today.

Interested? Then write now with full details about yourself or, if you'd prefer, telephone for an application form to Jill Christison, Personnel Officer, IBM Information Services Ltd., PO Box 39, North Harbour, Portsmouth PO6 3AA (Tel: 07018 21044 Ext. 3624) quoting ref: CVV/936971.

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Develop with Courage

Courage, a division of the Imperial Group Limited is one of the largest brewing companies in the UK and encompasses breweries, distribution depots and public houses. Our Data Processing Centre is in a new building in Western Avenue close to Park Royal and North Acton tube stations. Our operation is based on two ICL 1903T computers currently running under George 3S using MAXIMOP. We are currently looking for a Senior Operator. You will work on a three shift system. The duties are varied and so offer interesting work in a very pleasant environment. We also provide full internal and external training to allow you to develop your technical skills. The successful applicant will have at least 18 months experience on ICL 1900 series equipment.

In return we offer an attractive starting salary and the additional benefits of discount car parking, pension and insurance arrangements and company products.

If you would like to contribute towards our further development and success please contact:

Barbara Wren,  
Personnel Administration Manager,  
Courage Ltd.,  
Data Processing Department,  
Mansfield House,  
336 Western Avenue,  
Acton W3, Tel: 01-992 5591.



**CONTRACT PROGRAMMER**  
COBOL/DOB/DL  
SOUTH ENGLAND  
TOP RATES

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Division Head/Computer Sales Division

## KUWAIT

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He/she will be a dynamic manager between 35 and 45 who has at one time been a Systems Analyst and ideally built up a computer sales division from scratch.

He/she will have a good sense of business with a computer science background and preferably have some experience with WANG Mini Computers.

He/she holds a valid driving licence and has a good command of the English language. Some knowledge of Arabic would be an asset.

Please submit your complete application, consisting of systematic C.V., copy references and recent photo to our Branch Office in West Germany.

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To help build up the new Computer Division outlining the following and in conjunction with the Group's professional management team:

- Sales activities
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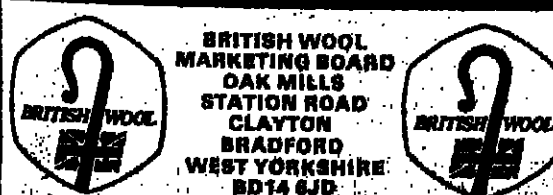
## SCIENTIFIC ASSISTANT (Computing)

We require a research assistant to operate and develop scientific data systems associated with mass spectrometry and other laboratory instrumentation. Applicants should possess an H.N.D. qualification, or equivalent, in Chemistry/Physics or Computing/Mathematics with G.C.E. 'O' levels in Chemistry and Physics. Experience of FORTRAN programming, preferably in a scientific environment, is essential, and an interest in the application of computers to scientific instruments would be an advantage.

This is a permanent staff appointment and conditions of work are excellent. The Centre is situated on the outskirts of the City and car parking space is available. First-class restaurant facilities. Flexible working hours in operation. Sports and Social Club. Re-location assistance will be provided if appropriate.

We shall be pleased to hear from interested applicants (male or female) who should write for an application form to:

Personnel Department (Folio 108)  
GROUP RESEARCH AND DEVELOPMENT CENTRE  
British-American Tobacco Company Limited  
Regent's Park Road, Millbrook, Southampton, SO9 1PE



**BRITISH WOOL MARKETING BOARD**  
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have the following vacancy

## ANALYST PROGRAMMER up to £5,000

The British Wool Marketing Board, which buys from sheep farmers and sells to the trade virtually all the fleeces wool produced in the United Kingdom, is replacing its present installation with a CTL 8050 using on-line data entry facilities.

Analyst Programmer, with at least 12 months' mini-computer experience is required immediately for a vital role in the multi-disciplinary development team, working mainly in London initially and subsequently in Bradford. A wonderful opportunity for YOU to enhance your skills and experience.

Help with relocation expenses, and temporary accommodation will be provided. Excellent working conditions; life insurance and contributory pension scheme; subsidised meals.

Details of education and career history to: Tony Bennett, Administrative Officer or ring Bradford (0274) 882091 for an application form.

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This position is an excellent opportunity for someone to pursue a career in computing.

The successful applicant, who will probably have been in operations for approximately one year, will join a small team operating dual Century computers, on a three shift basis, processing a range of batch and on-line systems. Previous Century experience, whilst advantageous, is not a necessity. The work load has increased considerably during the past year, and with further development work in progress the person appointed can look forward to healthy future prospects within this expanding installation.

The company is a well known retail organisation with one hundred and twenty outlets throughout the London area. It is backed by the resources of a major international consortium which has developed a strong commitment to data processing.

In addition to the commencing salary, which is supplemented by six monthly increments, a valuable range of fringe benefits is offered including a pension scheme, four weeks' holiday and subsidised canteen.

24-hr. answering service  
Please telephone for a confidential discussion or write to:  
30 Fleet Street London EC4Y 1AA  
01-353 0981

City Treasurer's Department

## COMPUTER PROGRAMMERS

(£2883-£4214 including supplements)

Applications are invited for two posts within the Department's Computer Section at the City Hall, Cardiff.

The installation consists of a 192K ICL 1904K processor with extensive communications facilities. Planning is currently taking place for the introduction of an ICL 2900 computer in the near future.

Preference will be given to applicants with experience of COBOL. The work will be within teams converting and writing COBOL programs to 2900 forward compatibility standards.

The commencing salary within the above range will be dependent upon qualifications and experience. A 37-hour 5-day week is worked, and the posts are supernumerary and covered by Local Government conditions of service.

APPLICATION FORMS ARE AVAILABLE FROM THE CITY PERSONNEL OFFICER, CITY HALL, CARDIFF CF1 3ND (TEL 31033 ext 430) AND MUST BE RETURNED NO LATER THAN 31st MAY, 1978.

CITY OF CARDIFF

## TRAINEE PROGRAMMER

Salary £4250 per annum plus other benefits

Must have experience in Systems 3 operation and data entry on IBM 3741 and willing to undertake programming training on Model 150 in multi-national environment.

Please telephone Miss Miller on 01-437 9878 for interview appointment.

Celtek (U.K.) Limited  
30 Old Burlington Street  
London W1X 2AR



### PROGRAMMER

LONDON, WC1

To £6,800

At least 3 years' FORTRAN and/or COBOL experience with Database as required for this large mainframe installation. Knowledge of one or more of the following is desirable: ADABAS, DBMS, ISB, TOTAL, IDS, QMS, IPL, RALPH and SYK.

### PROGRAMMER/ANALYST

LONDON, E4

To £6,800

An RPD II programmer in their early 20's looking for an opening into systems would be ideal for this position in a manufacturing company. IBM system 3 model 10 with delivery of a new machine imminent.

### PROGRAMMERS

LONDON, EC1

MEG

With 2 or more years' experience for a nationwide role. If you have an IBM background with COBOL, BAL, PL1 or ICL 2960/10/80 with DEC PDP11, MACRO 11, ASSEMBLER or BASIC please apply. Programmers with any microcomputer experience would also be of interest.

PLEASE TELEPHONE FOR AN APPLICATION FORM

**AMES PERSONNEL**  
TELEPHONE: 01-767 0611

## BOLTON INSTITUTE OF TECHNOLOGY ELECTRICAL ENGINEERING DEPARTMENT RESEARCH ASSISTANT

Applications are invited from Graduates in Electrical Engineering for a Research Assistant to work for a Higher Degree in one of the following areas:

1. Microprocessor Applications
2. Medical Electronics
3. Digital Control

The Department is equipped with several Motorola and Intel Microprocessors in addition to a comprehensive disk based real-time PDP-8 system. A PDP-11 graphics system is also available. Course assemblies have been written for both 6800 and 6800 to run on the PDP-8.

The successful candidate will be expected to register for a Higher Degree and to undertake some duties of a teaching nature.

Salary AF II - £2,841-£3,165 (plus 5% Phase 2 supplement). Application forms should be returned by 31st May, 1978 to: The Principal, Bolton Institute of Technology, Deane Road, Bolton BL3 5AB.

## Communicate with Racal

Racal-Milgo Limited as a wholly owned subsidiary of the Racal Electronics Group of Companies and specialising as leader in the field of Data Communications Equipment, have a requirement for a Regional Sales Manager to be based in the Northern Region Office on the south side of Manchester.

The person (Male/Female) will be expected to control areas of the Company's business in an area north of the Midlands and will be directly responsible to the UK Sales Manager for the continuing business success in this area.

The successful person will probably possess a Degree or equivalent qualification and have experience in a technical sales environment. Experience in data processing or a computer related field is highly desirable. Proven field sales managerial experience is essential.

A basic salary commensurate with the responsibility of the position will be paid. A company car will be provided and the person will participate in a commission scheme. An attractive contributory pension scheme is provided and assistance with relocation will be considered where appropriate.

Write with details of age, experience and current earnings to:

D.J. Kichenald,  
Personnel Officer,  
Racal-Milgo Ltd.,  
Prospect House,  
Thorn Street, Reading, Berks.

Regional Sales Manager (North)

Data Communications

**RACAL**